JOB CHARACTERISTICS THEORY

a revised model

A thesis submitted in partial fulfilment
of the requirements for the Degree
of Master of Arts in Psychology

Jo Ashton-Martyn

University of Canterbury

1987

CONTENTS

LIST OF FIGURES

LIST OF TABLES

ABSTRACT

A study was undertaken to investigate the relationships between objective and subjective measures of job characteristics using a modified version of the Job Characteristics Model (JCM, Hackman and Oldham, 1975). Role clarity and challenge were proposed as new psychological states. It was proposed that the personal work outcomes influenced the outcome variables. The dimensionality of the job characteristics was tested, as was the moderating effect of growth need strength (GNS). Personal and contextual variables and knowledge and skill were tested as predictors of the psychological states and outcome variables.

The psychology course work was rated by 328 stage one psychology students using the Job Diagnostic Survey (JDS) and by the course supervisors using the Job Rating Form (JRF; N= 12) and the Position Analysis Questionnaire (PAQ; N= 5). Performance was measured using the formal course requirements over four assessments.

Objective measures were effective for high GNS subjects in the prediction of outcome variables, particularly for attendance. No relationship was found between the PAQ dimensions with performance and general satisfaction. General satisfaction predicted both performance and attendance. No moderating effect by GNS was discovered for the personal work outcomes or for performance. GNS was found to moderate the relationship between the psychological states and attendance. The multi-dimensionality of job characteristics was confirmed for this sample. Personal and contextual variables and knowledge and skill were useful predictors of the psychological states and outcome variables. A new Job Characteristics Model is proposed.

Chapter One

INTRODUCTION

The maximisation of employee job motivation and satisfaction, and at the same time, maximising productivity for the organisation are central goals for job designers. One of the contemporary approaches to job design has been through job enrichment, which typically involves building greater scope for personal achievement and recognition, together with greater opportunity for growth into employees' jobs.

The job enrichment approach to job design is a comparatively recent management strategy. Earlier this century, when scientific management was in its heyday, (Taylor,1911) the focus was upon the application of job specialisation. The theory was that by simplifying and routinising jobs, employees would be more efficient in their work and the control of management over production would be increased, and that this in turn would result in an increase in organisational profits. Experimental research has demonstrated that this approach has led to high employee dissatisfaction, to increased absenteeism and turnover, and decreased productivity in some cases (for example, Guest, 1955; Walker, 1955).

In response to the negative findings briefly outlined above, there was a swing in attitude, and research, against work specialisation, towards job enlargement and enrichment. Early research in this area focused on enlarging various jobs to determine whether or not worker productivity and satisfaction would increase if jobs were designed so as to be more meaningful and challenging to employees (for example, Conant and Kilbridge,1965; Davis and Valfer,1965). However, this initial research relied for the main part on case study methods, and lacked experimental rigour. Therefore, little in the way of theoretical advancement toward a conceptual framework upon which testable hypotheses could be generated resulted from those studies.

The content of work was investigated in terms of job characteristics by Turner and Lawrence (1965). Those authors proposed that underlying job characteristics were related to absenteeism and job satisfaction experienced by the job incumbent. Individual differences were found to exist between rural and urban workers.

Turner and Lawrence's study lead to an abundance of similar research. The work of Hackman and Lawler (1971) integrated the area of work motivation with the basis of job characteristics proposed by Turner and Lawrence (1965). Hackman and Lawler (1971) suggested that rather than cultural or group differences existing between rural and urban dwellers, differences in work responses occur at an individual level. These authors proposed that individuals will respond differently to the job characteristics underlying their work. The differential response, according to Hackman and Lawler (1971), is due to the individual's growth need strength (GNS) level. Findings reported by Hackman and Lawler (1971) supported the hypothesis that individuals with high GNS respond with higher job satisfaction, internal work motivation and performance, and lower absenteeism if their jobs are high on the four job characteristics.

The framework tested by Hackman and Lawler (1971) was formalised into the Job Characteristics Model, and the Job Diagnostic Survey was developed to test the model (Hackman and Oldham, 1975). The large amount of research published in the area prompted Roberts and Glick (1981, p. 193) to comment that

> "By far the most popular approach to task design research emanates from the Job Characteristics Model".

The general structure of the balance of this research is as follows. In chapter two, the genesis of the job design literature is discussed. This is followed by a review of the development of the Job Characteristics Model (Hackman and Oldham, 1974, 1975); and current research and further extensions to the model. Areas which are examined in greater detail include : the dimensionality of the Job Characteristics Model; tests of the moderating effects of growth need strength; personal and context predictor variables and knowledge and skill; and various attempts to synthesise objective and subjective approaches to work design.

This is followed by a chapter which outlines the research rationale on which this study was based and a brief description of job analysis, and in particular the Position Analysis Questionnaire (McCormick, Jeanneret and Mecham, 1969, 1972). Chapter four describes the subjects, the research instruments and the research procedure applied in this study. The results of the research are presented in Chapter five and these are in turn discussed in Chapter six. The study concludes with the references, copies of the research instruments and appendices.

Chapter Two

EARLY RESEARCH

Many theories are said to have influenced Hackman and Oldham (1975) in their conceptualisation of the Job Characteristics Model. Herzberg's Two-Factor theory of Satisfaction and Motivation (Herzberg, Mausner and Snyderman, 1959; Herzberg, 1966) was the most influential in the development of the job design approach. The theory proposes that a job should enhance employee motivation only to the extent that motivators (including achievement, recognition, responsibility, advancement and growth in competence) are designed into the work itself. Although acknowledging that the Two-Factor theory conceptually influenced their own thinking, Hackman and Oldham (1975) noted that it did not specify how an individual worker would interact in the presence/absence of the five motivators determining job satisfaction and job performance. Nor did the theory indicate how to measure the presence or absence of the motivating conditions (Hackman and Lawler, 1971).

Other perspectives also influenced Hackman and Lawler (1971). Activation theory (Berlyne, 1967) suggests that when employees engage in work which is arousal-enhancing, they will attain a higher performance level together with a greater sense of well-being and satisfaction. However, activation theory gives little indication about how to procede in implementing work redesign programmes. Socio-technical systems theory views the workplace in terms of an inter-relationship between the technical aspects of the work itself and the social situation in which the job takes place. However, this theory is based on the work group, rather than the individual worker. Using the socio-technical systems theory it is not easy to predict an individual's work performance or affective reactions to the job, or methods to improve that performance or satisfaction.

Two further theories which influenced Hackman and Oldham (1975) were expectancy theory (Steers and Mowday, 1977) and Maslow's need hierarchy (1943), although the direct applicability of each of these theories to the work place is limited. Again, the first and foremost problem is the lack of direction in implementing the redesign of a job.

On a more empirical and substantive level, however, there were two other sets of research which focused explicitly on the problem of measuring job characteristics. Turner and Lawrence (1965) developed operational measures for six Requisite Task Attributes which were predicted to be positively related to employee satisfaction and attendance. The six attributes were : variety, autonomy, required interaction, optional interaction, knowledge and skill required and responsibility. From these six attributes, the Requisite Task Attributes Index (RTA) was developed. The RTA provided a summary measure of the nature of jobs and of employees' reactions to them (in terms of job satisfaction and attendance).

Turner and Lawrence (1965) predicted that employees working on jobs which were high on the RTA Index would have higher job satisfaction and lower absenteeism. This prediction was not fully supported. Empirical findings demonstrated that the predicted relationship between the RTA Index were substantially moderated by differences in the cultural and social backgrounds of employees, and that support for the hypotheses was generated only by rural and sub-urban blue-collar workers, and not by city dwelling urban workers.

Subsequent research that focused directly on job characteristics also dealt with individual differences in worker responses on a sub-cultural level, in terms of differences between town and city employees (Hulin and Blood, 1968). The authors hypothesise that alienation from traditional middle-class work norms (typically thought of as the "protestant work ethic") was an important moderating factor in determining workers' responses to their jobs. Employees holding traditional work values, as would be expected of employees in small town factories in the Turner and Lawrence (1965) study, should respond more positively to more complex jobs. When employees are alienated from the norms, as might be expected of urban workers, more complex jobs should be responded to negatively. Blood and Hulin (1967) provided data supporting

this general proposition.

Both of these sets of findings indicate that the complexity of jobs may not be directly linked to improved job satisfaction, attendance and/or work performance. It appears that certain characteristics of employees must be taken into account, together with the characteristics of their jobs in order to generate valid predictions of the behavioural and affective responses of workers.

In an extension of the aforementioned studies, Hackman and Lawler (1971) adopted a differential rather than a subcultural framework. They discarded the categories of town and city workers and focused on individual differences in terms of growth need strength as a moderator in the relationship between job characteristics and job satisfaction, absenteeism and performance. Growth need strength refers to the employee's motivation for growth in the workplace, that is, needs for personal challenge and accomplishment, for learning and for professional development (Graen, Scandura and Graen, 1986). This led to the development of what has come to be called the Job Characteristics Model.

THE DEVELOPMENT OF THE JOB CHARACTERISTICS MODEL

Research by Hackman and Lawler (1971) demonstrated that job characteristics can directly affect employee attitudes and behaviour. In their study of two hundred and eight employees and sixty-two supervisors in a telephone company, Hackman and Lawler (1971) proposed a framework which related job characteristics to affective reactions to work and performance and attendance. The framework produced by Hackman and Lawler (1971) related four core job dimensions (variety, autonomy, task identity and feedback) to job satisfaction, work motivation, absenteeism and job performance. The authors had also hypothesised that individuals with high growth needs would respond more positively than those with low growth needs, and the results were generally supportive of the hypothesis. Based on the expectancy theory of motivation (Tolman,1959; as cited by Hackman and Lawler, 1971), the authors concluded that for jobs to internally motivate individuals they must provide for three psychological states which :

(a) allow workers to feel personally responsible for an identifiable and meaningful portion of the work;

(b) provide work outcomes which are intrinsically meaningful or otherwise experienced as worthwhile; and

(c) provide feedback about performance effectiveness.

In the framework suggested by Hackman and Lawler (1971), the four requisite task attributes which had been identified by Turner and Lawrence (1965), were said to influence the three psychological states above. Autonomy was claimed to determine the degree to which workers feel personal responsibility for their work. Jobs high in task identity and variety were suggested to be likely to be experienced as more meaningful to the employee than jobs with low levels of those attributes. Finally, performance feedback was proposed to result from doing the task itself, and/or from some other person, a co-worker or supervisor.

Hackman and Lawler (1971) suggested that individual differences in the desire for higher-order need satisfaction (GNS, based on the work of Maslow, 1954) moderated the relationships between job characteristics and the personal and work outcomes. The model was applicable only to those employees with high growth needs. In brief, according to the 1971 framework, high job satisfaction, high performance levels and low absenteeism/job turnover should result from positions with high levels of job variety, task identity and feedback for individuals with high GNS.

In their job framework, Hackman and Lawler (1971) also proposed the existence of two inter-personal dimensions, dealing with others and friendship opportunities which were based on Turner and Lawrence's (1965) dimensions of required interaction and optional interaction. The two additional dimensions were included to assess the impact of the inter-personal characteristics of job design. Hackman and Lawler (1971) found that these two additional dimensions were related to certain types of satisfaction (for example, self-esteem and security) but overall the relationships were not substantial. Dealing with others and friendship opportunities were assessed to be unimportant as core job dimensions, and were eliminated from the model. This decision would later bring the model under criticism, particularly from socio-technical theorists, for

neglecting the social/contextual aspects of the workplace (Griffin, 1983; Rousseau, 1977).

However, in the revised version of the Job Characteristics Model (Hackman and Oldham, 1980) social/contextual measures were reinstated. Context factors including co-worker satisfaction and supervisory, pay and job security satisfaction, were specified as moderating variables between the core job dimensions, the psychological states and the work and personal outcomes.

In 1975, Hackman and Oldham presented a diagramatic version of their Job Characteristics Model (see figure one). Turner and Lawrence's (1965) task attributes autonomy, task identity, feedback and variety were retained, together with their proposed links with Tolman's (1959) psychological states. The behavioural outcomes, job satisfaction, performance, absenteeism and turnover, hypothesised by Turner and Lawrence (1965) to result from high RTA scores, were also maintained.

In addition, Hackman and Oldham (1975) introduced an instrument that operationalised the Job Characteristics Model, and which they termed the Job Diagnostic Survey (the JDS). This significant development distinguished Hackman and Oldham (1975) from previous researchers in that the authors had produced a standardised research instrument that was applicable in a variety of work contexts. The origins of the JDS were in the methodologies developed by Turner and Lawrence (1965) and Hackman and Lawler (1971) and many of the scale items used by these researchers were retained or revised for the new measure.

The purpose of the JDS was "to be of use both in the diagnosis of jobs prior to their redesign, and in research and evaluation activities aimed at assessing the effects of redesigned jobs on the people who do them". (Hackman and Oldham, 1975, p.159). A companion to the JDS, called the Job Rating Form (JRF), was also produced. Assessments of jobs were made by both the job encuments, using the JDS, and by supervisors and /or observers with the JRF. The rationale for the JRF was to provide an indirect test of the 'objectivity' of employee ratings.

The Job Characteristics Model presented by Hackman and Oldham (1975) was

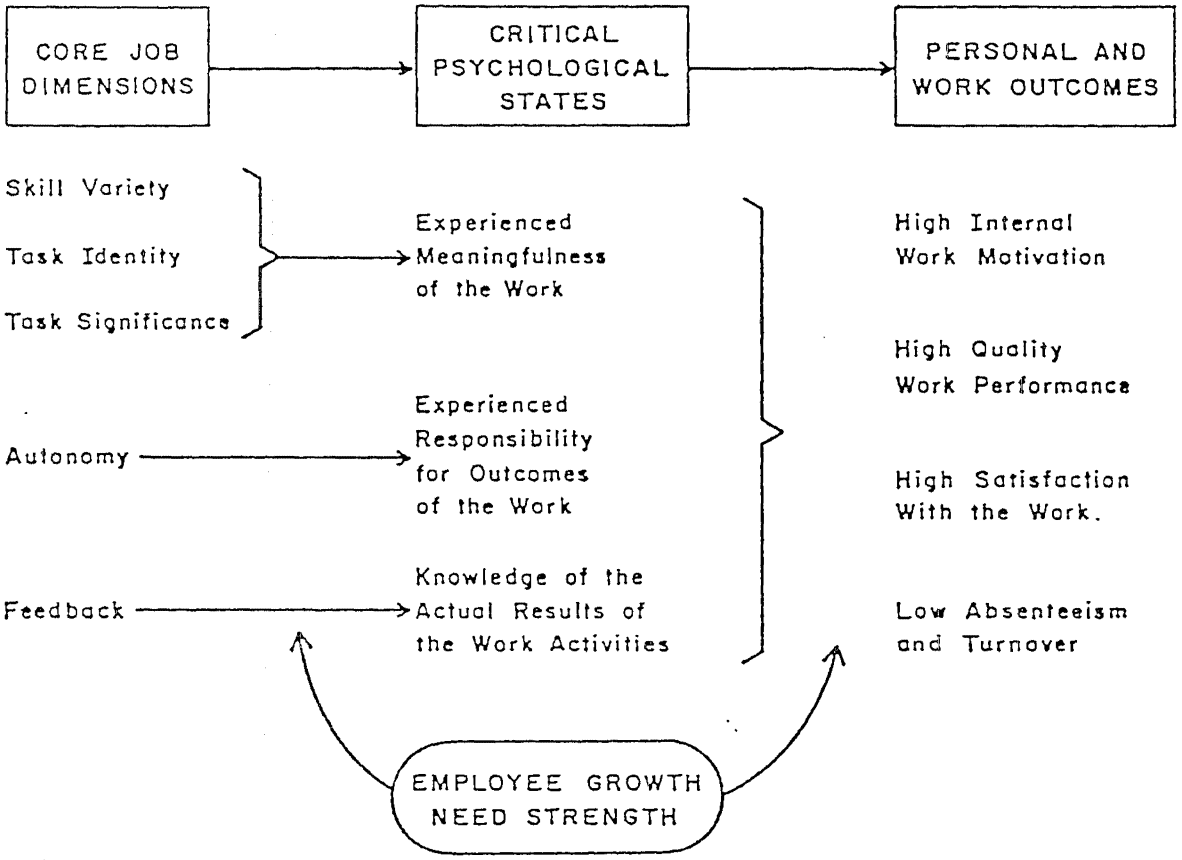


FIG. 1. The job characteristics model

(Hackman and Oldham, 1975).

based on the Hackman and Lawler (1971) version with several important modifications. The first modification to the original conceptualisation of the Job Characteristics Model was the unexplained inclusion of a fifth job dimension called *task significance*. This fifth job dimension which was defined as "the degree to which the job has a substantial impact on the lives or work of other people - whether in the immediate organisation or in the external environment", is theorised to contribute to the experienced meaningfulness of the work.

Second, the two interpersonal dimensions, dealing with others and friendship opportunities are no longer considered core job dimensions (although dealing with others is tapped by the JDS). Fourth, work motivation was theorised to result from interaction between the job dimensions, and the moderating effect of GNS on the psychological states.

Furthermore, using Job Characteristics Theory, Hackman and Oldham (1975) generated a summary score reflecting the overall 'Motivating Potential' (MPS) of a job in terms of the five job dimension. The score is computed as follows :

MPS = (((variety x identity x task significance) /3) x autonomy x feedback)

The model, then, embodies four elements which relate to work behaviour. They are :

(1) Job dimensions which relate to psychological states. These are variety, task identity and task significance which were said to contribute to experienced meaningfulness; autonomy which was said to determine experienced responsibility; and feedback which was said to contribute to knowledge of results.
(2) The psychological states of experienced meaningfulness, experienced responsibility and knowledge of actual work results.
(3) Individual GNS. Need strength was hypothesised to moderate the relationships between the job dimensions and the perceived psychological states, and between the psychological states and the personal and work outcomes.
(4) Outcome variables, which comprise work motivation, work performance, job satisfaction and absenteeism/turnover.

A subsequent revision of the Job Characteristics Model by Hackman and

Oldham (1980) incorporated five modifications to the earlier (1975) version. The first change involved the elimination of absenteeism and turnover as outcome variables. The research evidence upon which this decision was made (for example, Hackman and Oldham, 1976; Hackman, Pierce and Wolfe, 1978) reported inconsistent results in that job enrichment was shown to lead to decreases, no difference at all and even increases in absenteeism. Hackman and Oldham (1980) claim that this differential reaction to job enrichment depends on the competence of the employees whose jobs are changed. (See Figure 2 for the updated version of the Job Characteristics Model).

Second, Hackman and Oldham (1980) made provision for differential employee competence in their modifications to the original model when they introduced a second moderating variable termed *knowledge and skill.* Probably the most important moderator of how a person reacts to a job is the level of knowledge and skill he/she has to perform it (Hackman and Suttle, 1977).

A third major change to the Job Characteristics Model was the inclusion of a third level of moderating variables called *context satisfactions.* Research supported the proposition that the impact of a job on a person is moderated by both the person's GNS level and by his or her satisfaction with the work context (Oldham, Hackman and Pierce, 1976).Fourth, the work outcome performance was redefined, (now termed *work effectiveness*), to include both the quality and quantity of the goods or services produced. Finally, a further outcome variable was added in this version of the Job Characteristics Model called *growth satisfaction.* No rationale was presented for this addition, just as none was given for the 1976 inclusion of task significance in the job dimensions.

Another research instrument that measures job design was developed by Sims, Szilagy and Keller (1976). Sims et al. (1976) identified six core dimensions using the Job Characteristics Inventory (JCI). In the JCI the four Hackman and Lawler (1971) dimensions autonomy, identity, variety and feedback were retained, together with the two

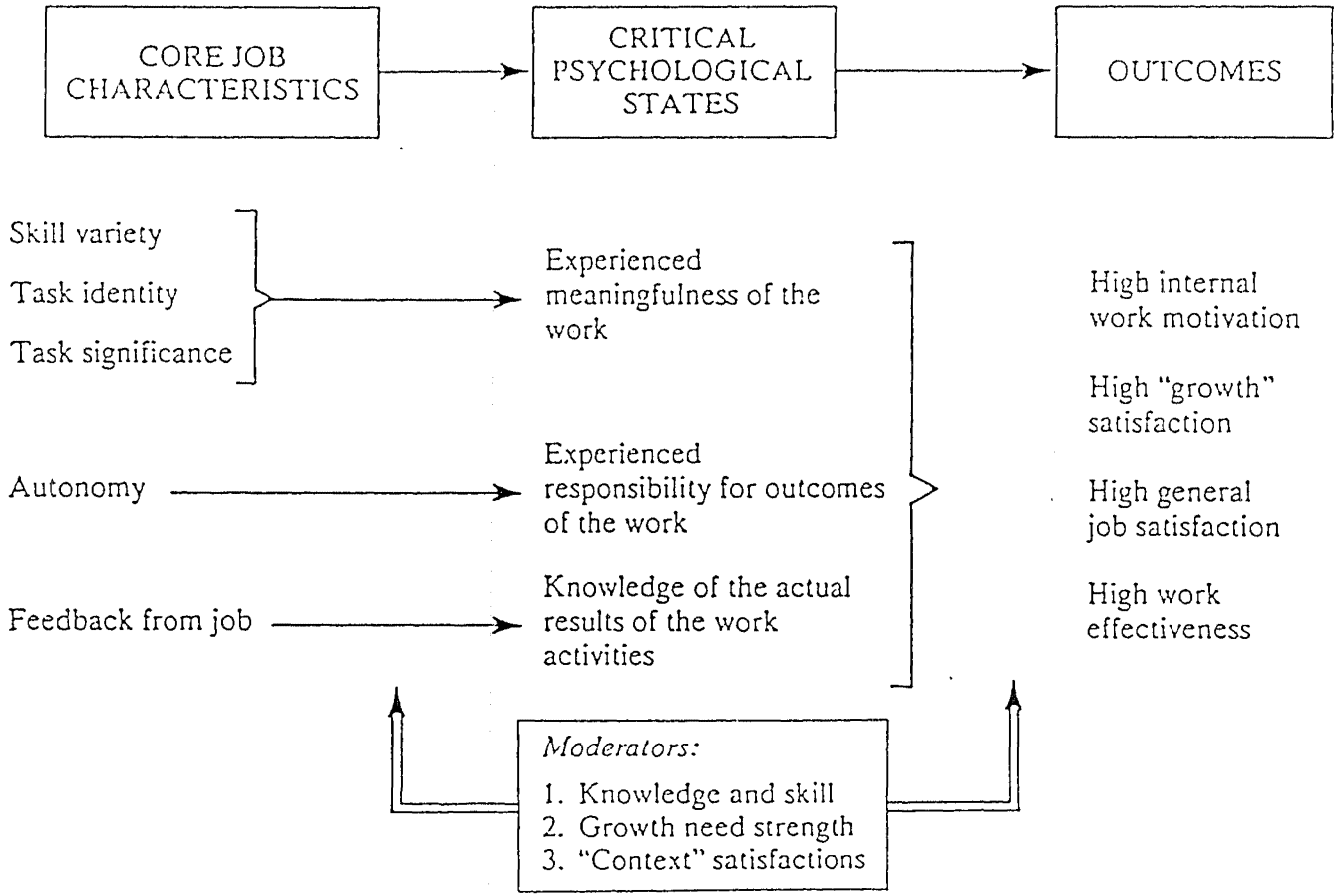


Figure 2. The Job Characteristics Model (Hackman and Oldham, 1980).

interpersonal factors of dealing with others and opportunities for friendship. Further research in the job design area used either the JCI or the JDS.

Many authors have added extensions and variations to the original Job Characteristics Model. Among them have been : technological uncertainty, (Brass, 1985); supervisory practice, (Cordery and Wall, 1985); and growth opportunities, (Graen et al., 1986), which were hypothesised to precede the job characteristics in the model. Additional moderator variables included organisational climate, (Ferris and Gilmore, 1984); job longevity, (Kemp and Cook, 1983) and significant others, (Montagno, 1985). Job and non-job activities, including job characteristics, were proposed to contribute to mental health in one study (Hesketh and Shouksmith,1986).

FURTHER RESEARCH WITH THE JOB CHARACTERISTICS MODEL

The Job Characteristics Model has become by far the most influential theoretical approach to work design (Cummings, 1982; Roberts and Glick, 1981). The reasons are readily apparent. The model clearly identifies a limited number of job content, individual difference and outcome variables, and specifies the causal relationships among them (Cordery and Wall, 1985). The model readily leads to empirically testable hypotheses and has consequently inspired a considerable body of research.

Several research areas focused upon in the present study are discussed in detail below. These include : assessments of the dimensionality of the JDS, and other methodological issues; tests of various moderating variables, including GNS, and context satisfactions, knowledge and skill and personal characteristics; evaluations of the synthesis of subjective and objective assessments in the workplace; and the model that was tested in the present research.

1) The Dimensionality of the Job Characteristics

In their initial development of the JDS, Hackman and Oldham (1975) administered the JDS to 658 employees from seven organisations. Internal consistency scale estimates ranged from .56 to .88, while between-scale median correlations were low, ranging from .12 to .28. The authors accepted this as evidence of the multidimensionality of the JDS. Hackman and Oldham (1975, p.166) stated that

> "There is no a priori reason to expect that the job dimensions would or should be completely independent, and that the moderate level of inter-correlation between them does not detract from their usefulness as separate job dimensions ...".
> The factorial structure of the JDS was not investigated.

Dunham (1976) administered the JDS to 3,610 corporate personnel. The with-in item correlations were generally larger than the between-scale item correlations, as Hackman and Oldham (1975) had found. However, the autonomy and variety items had relatively high inter-scale correlations. Factor analysis using an oblimax rotation suggested that although a unidimensional solution would have been most parsimonious, it was possible to define a four-factor solution. Task identity, task significance and job feedback were reproduced according to their a priori structure. The fourth factor was a combination of variety and autonomy.

Twenty samples of workers were examined in Dunham, Aldag and Brief's (1977) factor analysis of the JDS. Using varimax rotations, the various groups identified 2-, 3-, 4- and 5-factor solutions. However the a priori Job Characteristics Model structure was produced in only two out of twenty cases. As the JDS was designed to be used *across* rather than between job categories it is more important to look at the factor solution for the entire sample. In the 4-factor solution, the a priori structure for task significance and identity were reproduced. Two of the autonomy items formed the third factor. The final factor was a combination of one item from each of the four a priori scales. The a priori structure proposed by Hackman and Oldham (1975) for the JDS therefore was not confirmed. In summation, the authors stated that

"...all users of the JDS should empirically examine the underlying dimensionality

for each and every sample." (Dunham et al., 1977 p. 223).

Harvey, Billings and Nilan (1985) performed eleven factor analyses in an effort to compare competing models of the JDS using confirmatory factor analysis. Unlike previous researchers, Harvey et al., (1985) included the two additional characteristics dealing with others and feedback from agents. The models were varied. Every possible combination and permutation of the following factors were tested : methods of rotation (orthogonal and oblique); Dunham's (1976) finding of a general factor model; Green, Armenakis, Marber and Bedeian's (1979) report that negatively worded items contributed construct-irrelevent bias to the data led Harvey et al., (1985) to propose that negatively wording items loaded onto a separate method factor; and the two different formats of rating scales used by the JDS were assessed. The first format uses a short text anchor for each of the seven scale points, the second uses only three anchors over the seven point scale but employs longer text in the anchors. Harvey et al., (1985) proposed that this variation in response format was accounted for by a three-anchor method factor.

Results indicated that the analysis that provided the best fit to the JDS data was seven factor model with oblique rotation plus the negatively-worded method factor and a three-anchor method factor when the rho fit index (RFI) and the root mean square residual covariance (RMSR) were used as the criterion. However, when the parsimonious fit index (PFI) was used as the criterion, the Dunham (1976) general factor model with a negative wording method factor and an orthogonal rotation was superior. No overall conclusion was made regarding the supremacy of either of the criterion methods. Dean and Brass (1985) administered the JDS to one hundred and forty employees of a newspaper publishing company and reported support for the a priori 5-factor structure hypothesised by Hackman and Oldham (1975).

One of the more interesting studies investigating the dimensionality of the JDS is that of Fried and Ferris (1986). A 3-factor solution was produced for the entire sample, retaining identity and feedback as dimensions, with a third dimension that collapsed variety, task significance and autonomy into a single factor.

Other studies which reported a similar lack of concurrence with the a priori factor

structure of Hackman and Oldham (1975) are Ferratt, Dunham and Pierce (1981) and Green et al. (1979) both studies produced 4-factor solutions.

In summary, some support was found for the a priori 5-factor solution (Dean and Brass, 1985; Ferratt et al., 1981, secretarial and pharmaceutical sample; and Harvey et al., 1985). (See Table 1 for a summary of the factor analytic solutions). The most common finding was a four-factor solution (Dunham et al., 1977; Ferratt et al., 1981, insurance sample; and Pierce et al., 1986; and Schnake and Dumler, 1985). One study reported a 3-factor solution (Fried and Ferris, 1986). Two studies reported a single general factor (Dunham, 1976; Harvey et al., 1985). Various combinations of the core job dimensions were evidenced in the factor analytic solutions. In the studies detailed above, task identity was the variable that was most consistently reproduced by the factor analysis in the a priori manner (Hackman and Oldham, 1975). The remaining variables, autonomy, variety, task significance and job feedback, were more frequently associated with factor loadings inconsistent with the a priori factor structure. Autonomy and variety items, in particular, were frequently loaded onto the same factor.Several reasons for the lack of confirmation of the a priori 5-factor structure have been suggested. The first intimates that the factor analytic method itself contributed to the problems. Harvey et al. (1985) suggested that *confirmatory* factor analysis was superior to the exploratory method in that exploratory factor analysis does not directly test a given model, as confirmatory factor analysis does. The second explanation revolves around the format of the JDS measures. The format of negatively worded items should be reversed to make the responses consistent with other items in the JDS (Harvey et al., 1985; Idaszak and Drasgow, 1987).

Third, the internal JDS structure has come to be questioned. Differential question structure between sections may have produced an overly complex response format (Green et al., 1979; Harvey et al., 1985). Green et al. (1979) computed between-section item correlations for each dimension. The authors concluded that the format of the items may be a confounding factor in interpreting factor analytic results.

Table 1. A Summary of Job Characteristic Factor Analytic Solutions

Solutions	Empirical Findings	Factors
1	Dunham 1976	Job Complexity
	Harvey et al., 1985 (PFI)	General factor
2		—
3	Fried and Ferris 1986 (entire sample)	Identity, Feedback & Autonomy+Variety+Significance
4	Dunham et al., 1977 (entire sample)	Autonomy, Significance, Identity, Autonomy+Variety+Significance+Feedback
	Ferratt et al., 1981 (insurance sample)	Variety, Identity, Significance+Feedback, Autonomy+Variety+Feedback
	Green et al., 1979	Variety, Significance+Identity+Feedback, Autonomy+Variety+Feedback, Autonomy+Significance+Identity
	Pierce et al., 1986 (discriminant analysis)	Identity, Autonomy+Significance, Feedback, Autonomy+Variety
	Schnake and Dumle, 1985	i) Autonomy, Identity, Feedback, Variety+Significance ii) Significance, Identity, Feedback, Autonomy+Variety
5	Dean and Brass, 1985	Autonomy, Variety, Significance, Identity, Feedback
	Ferratt et al., 1981 (secretarial and pharmaceutical sample)	Autonomy, Variety, Significance, Identity, Feedback Significance, Identity, Autonomy+Variety, Autonomy+Variety+Significance+ Feedback, Variety+Identity+Feedback
	Fried and Ferris 1986 (young, educated sample)	Autonomy, Variety, Significance, Identity, Feedback
6	Idaszak & Drasgow,1987	Autonomy, Variety, Significance, Identity, Feedback, Autonomy+Variety+Significance +Identity+Feedback
7	Harvey et al., 1985 (RMSR, RHO)	Autonomy, Variety, Significance, Identity, Feedback, Dealing with Others, Feedback from Agents

Note : the Ferratt et al., (1981) factor analyses were performed in conjunction with the JDS and : the JDI (insurance sample), the SWS (secretarial sample) and the IOR (pharmaceutical sample). Schnake and Dumler (1985) tested two samples. Key : (PFI) parsimonious fit index; (RFI) rho fit index; (RMSR) root mean square residual covariance.

The fourth explanation for factor structure variance rests with the sample used in the research. Dunham et al. (1977) commented that the underlying dimensionality of the JDS is inconsistent across samples, and strongly recommended that future researchers test the factor dimensionality for each and every sample. Green et al. (1979) concurred, observing that the resulting factor structure is highly dependent on the idiosyncratic characteristics of the respondents.

An assessment of the interactive effects of subject idiosyncratic differences in the form of age, level of education and position level in the organisational hierarchy was made by Fried and Ferris (1986) in their re-analysis of the original JDS data base from 6,930 employees in 876 jobs in 56 organisations (Oldham, Hackman and Stepina, 1979). The findings supported Dunham et al. (1977) and Green et al. 's (1979) assertions that the JDS factor structure varies across samples. Fried and Ferris (1986) reported that the a priori 5-factor structure was produced for young (< 20-29 years), and for highly educated (some graduate work or graduate degree) people in the management and employee levels of the organisation. Non-managerial employees, older people and those with a lower level of formal education produced results which were represented by either 4-, 3- or 2-factor dimensionality. It appears, then, that both personal and contextual variables influence the ability to differentiate among job dimensions.

Criticism has been directed at the Job Characteristics Model, implying that affective responses have confounded job design perceptions. Ferratt et al. (1981) tested the discriminant validity of several job design measures (including the JDS and the JCI) and job satisfaction instruments (including the Job Descriptive Index). Ferratt et al. (1981) followed the premise that using factor analysis, job design and job satisfaction items should load on separate factors. Some overlap in the measurement domain was discovered between the JDS and the JCI with the job satisfaction measures. This finding suggests that the description of jobs and affective evaluation may not be separate processes.

This research was followed up by Schnake and Dumler (1985) with two samples ($\underline{N}$ = 4,605 and $\underline{N}$ = 3,025 employees) from two large organisations with the same parent company. The 15-item version of the JDS was factor analysed for each sample. For the first group the original scales of feedback, autonomy and identity were produced, but

all three of the task significance items and all three of the variety items converged to form a single factor. The original factors of significance, feedback and identity were reproduced with the second sample, and the two dimensions autonomy and variety collapsed forming a single factor. Schnake and Dumler (1985) then partialled out the effects of intrinsic job satisfaction, and factor analysed the remaining data. They found that the a priori factor structure of the Job Characteristics Model was confirmed exactly.

The level of discrimination between measures of job characteristics and job satisfaction together with an investigation into the convergence in the job design construct and its operationalisation was studied by Pierce, McTavish and Knudsen (1986). The authors reported ANOVAs performed on the two measures resulted in the finding that both the JDS and the JCI were more pragmatic than emotional in nature (significance $p < 0.05$). Pierce et al. conclude that

> "...from an operational perspective, both job design scales basically mirror the job design construct : by being pragmatically oriented, by not placing an emphasis on the assessment of emotionality and by assessing the multidimensionality of the job domain." (Pierce et al., 1986, p. 311).

The authors also claim that they found evidence of discriminant validity in that the job design scales are worded to emphasise fundamentally different ideas from those emphasised in job satisfaction instruments. In summation, it appears that there may be some confounding of the JDS by affective responses, although the results and conclusions are mixed.

In conclusion, the job characteristics' dimensionality is fundamental to the Job Characteristics Model. Although the job characteristics were not necessarily completely independent (Hackman and Oldham, 1975), the five characteristics were proposed by these authors to underlie the model. As was discussed above, empirical evidence for the a priori factor structure of the characteristics has been mixed, with the most common finding being a four-factor solution. Reasons proposed to account for this lack of confirmation are several and varied. Dunham et al. (1977) and Green et al. (1979) recommended that future researchers assess the dimensionality of every sample. This recommendation was supported by the findings of Fried and Ferris (1986) who demonstrated differential factorial structure for sub-groups.

Other proposals for findings that deviated from the a priori factor structure included : negatively worded items (Harvey et al., 1985; Idszak and Drasgow, 1987); differential question structure (Green et al., 1979; Harvey et al., 1985); and factor analytic style (Harvey et al., 1985) who proposed that confirmatory factor analysis is more appropriate than exploratory factor analysis.

2) Tests of the Moderating Effects of GNS

Growth need strength refers to the employee's motivation for growth in the workplace, that is, needs for personal challenge and accomplishment, for learning and for professional development (Graen, et al., 1986). Need strength has two functions in the Job Characteristics Model. Firstly, GNS is used to define the population to whom the model applies.

> "The basic prediction is that people who have high need strength for personal growth and development will respond more positively to a job high in motivating potential than people with low GNS" (Hackman and Oldham, 1975 p. 258).

The model as it stands, then, is limited in generalisability to those workers with high need strength.

Second, need strength is hypothesised to perform a moderating function at two levels, firstly between job characteristics and the psychological states, and secondly between the psychological states and personal and work outcomes. Distinction between the two functions of need strength has remained largely unclear in the empirical literature. For the main part, the efficacy of GNS has been assessed by correlating the job dimensions with psychological states and outcomes, and comparing the coefficients of the top and bottom thirds or quartiles of the sample on GNS levels (for example, Hackman and Oldham, 1975; Oldham et al., 1976; Loher, Noe, Moeller and Fitzgerald, 1985; Spector, 1985; Umstot, Bell and Mitchell, 1976).

It is inferred from this approach that researchers claim to be testing both the moderating effects of GNS and the differential predictors for high and low strength

groups. The author proposes that the correlational approach was testing only the GNS level function of need strength (that is, that high need strength workers should respond more positively than low GNS workers). No assessment of the moderating function of need strength was being made. Improvements to this approach are discussed below.

Research assessing the effects of GNS has produced varied results. Approaches to the assessment of need strength within the correlational approach have been diverse. Many of the studies failed to test the two hypothesised levels of interaction, and looked only for main effects between the job characteristics and personal and work outcomes (for example, Graen et al., 1986; Loher et al., 1985). Other researchers reported their findings significant only if the correlation coefficients were significantly different for the high and low GNS groups (Oldham et al., 1976).

No attempt has been made in the model to identify desirable task characteristics for low need strength individuals (Roberts and Glick, 1981). A model that operates for a select third or fourth of a sample is obviously limited in application and generalizability of findings. Data from low level GNS subjects has been utilised basically as a comparison group for the high GNS subjects. The intermediate level, those people with medium need strength, appear to have been included in only one study (Graen et al., 1986). The present study employs all three need strength levels, high, medium and low, in testing the power of the model.

Empirical findings of GNS moderation and each outcome variable are mixed. Support for the moderating effect of GNS between job characteristics and psychological states was found by Hackman and Oldham (1976) and Arnold and House (1980), although Arnold and House found GNS a more effective moderator of the job characteristics - psychological states relationship than the relationship between psychological states and job outcomes.

Findings have been varied for the internal work motivation-job characteristics relationship when the moderating effect of GNS has been tested. Supportive results were reported by Hackman and Lawler (1971), Hackman and Oldham (1976), and Spector (1985, using a meta-analysis assessment). Other studies found that need strength did not appear to moderate the relationship between job characteristics and

internal work motivation (Arnold and House, 1980; Oldham et al., 1976).

Several studies that tested the moderating effect of GNS on the relationship between job characteristics and job performance reported a significant effect, including a field experiment (Graen et al., 1986); and cross-sectional studies (Hackman and Lawler, 1971; Hackman and Oldham, 1976; Spector, 1985). Other researchers failed to find support for the relationship (Farh and Scott, 1983; Oldham et al., 1976; Orpen, 1979; Umstot et al., 1976).

The strongest empirical support has been found for the moderating effect of GNS between job characteristics and job satisfaction (Arnold and House, 1980; Hackman and Lawler, 1971; Hackman and Oldham, 1976; Loher et al., 1985; Spector, 1985; Umstot et al., 1976). However these findings were not universal (Farh and Scott, 1983; Hogan and Martell, 1987; Kemp and Cook, 1983; Orpen, 1979).

No support at all has been found for the relationship between job characteristics and absenteeism and turnover (Hackman and Lawler, 1971; Hackman and Oldham, 1976; Orpen, 1979; Spector, 1985). These variables were eliminated in the revised Job Characteristics Model (Hackman and Oldham, 1980).

Roberts and Glick (1981) strongly questioned the utility of GNS as a moderator of the job characteristics - employee outcomes relationships. However, as the studies outlined above indicate, need strength has at times influenced the explanatory capabilities for the outcome variables job satisfaction, work motivation and work performance and thereby has in part justified its existence.

Several improvements to the assessment of GNS are possible. The correlational approach, outlined above, can be improved by separately testing both GNS functions. The Job Characteristics Model implicitly hypothesises a unidimensional causal link from the job characteristics to the moderating variables (GNS and contextual variables) to the psychological states to the moderators to the personal and work outcomes. It is therefore appropriate to use multiple regression in the prediction of both the psychological states and the model outcomes.

Empirical use of regression in the assessment of need strength has been sporadic. Roberts and Glick (1981, p.210) commented negatively on the reliance on correlational data, stating that

> "... existing research cannot demonstrate causality (of moderator variables) and provides only minimal evidence to task-moderator-response associations".

Hackman and Oldham (1976) used multiple regression to assess the mediating function of the psychological states between the job dimensions and outcomes, but did not include GNS in the equations.

In order to test the Hackman and Oldham (1975) hypothesis that people with high need strength will respond more positively to a job high in motivating potential than people with low GNS, the subject pool may be divided into three groups, high, medium and low GNS levels on the basis of their GNS scores. *Separate* regressions for each of the levels enables comparison of the efficacy of the model to account for explained variance of both psychological states and outcomes. According to Hackman and Oldham's (1975) hypothesis a greater proportion of explained variance should be accounted for for high need strength people than for medium and low need strength people.

The moderating effect of need strength on the relationships between the job dimensions, psychological states and outcomes, can be assessed using hierarchical regression (Arnold and House, 1980; Graen et al., 1986; Zedeck, 1971). The various inclusion levels of the hierarchical regression are as follows. The first level entails the regression of the psychological states on the variables that precede the psychological states, using step-wise regression to select the significant predictors. In the second step, the psychological states are regressed onto the significant predictors and the growth needs measure, and thirdly on the significant independent variables, GNS and the product of each significant predictor multiplied by need strength. Similarly, the outcome variables are regressed upon variables that precede them in the model. Need strength is included in the second regression level, and finally the products of the significant predictors multiplied by GNS are incorporated into the prediction of each of

the outcome variables.

The increment of explained variance for the first to the second step should be insignificant, and the increment from the second to the third step must be significant for the variable to be called a moderator (Zedeck, 1971). This variation of multiple regression allows a distinction to be made between a possible *moderating* effect by a variable, and a *predictor* effect.

In conclusion, the assessment of the two functions of need strength in the literature has been poorly executed. The trend towards the retention of inappropriate testing methods purely on the basis that it enables comparision with previous findings is not helpful. The two functions of need strength must be tested separately, using multiple regression to distinguish the differential amounts of variance accounted for by the Job Characteristics Model for each need strength level, and using hierarchical regression with the entire sample to assess the efficacy of need strength as a moderator variable.

3) Context Moderator Variables

Many variables have been postulated to moderate the job characteristics - psychological states - outcomes links, for example, significant other's job complexity (Oldham and Miller, 1979); referent others' job complexity (Oldham, Nottenburg, Kassner, Ferris, Fedor and Masters, 1982); comparison others (Montagno, 1985); self-esteem (Tharenou and Harker, 1984). Organisational climate was found to moderate the relationship between job complexity and satisfaction (Ferris and Gilmore, 1984). Kemp and Cook (1983) reported that job longevity did not moderate the relationship between job complexity and job satisfaction.

As discussed earlier, the 1980 version of the Job Characteristics Model incorporated two additional moderating variables. The first, knowledge and skill, has been neglected in research in this tradition. The second level of moderating variables, context satisfactions, comprises measures of co-worker, supervisor, pay and job security satisfaction. This addition was primarily based on the findings of Oldham et al.,

(1976) who reported moderate support for the work context, performance, internal work motivation and salary relationships. Moderate support was also found for a combination of GNS/context moderators. That is, employees who were satisfied with their work context and who also had high GNS responded more positively to enriched jobs than did workers who had low need strength and/or who were dissatisfied with the work context. In an experimental setting, Orpen (1979) reported that a summary score of contextual variables, which included security, pay, supervisor and co-worker satisfactions, moderated job satisfaction and job involvement but not performance and work motivation.

Contextual factors were also found to be influential in the perception of jobs for people with low need strength (Loher et al., 1985).

4) Syntheses of Subjective and Objective Ratings

The Job Characteristics Model is essentially subjective in perspective. A task is assessed as perceived by the job encumbent.

> "Regardless of the amount of feedback (or variety or autonomy or identity) a worker really has in his work, it is how much he perceives that he has which will affect his reactions to the job" (Hackman and Lawler, 1971, pp. 264-265).

What remains unclear is the relationship between the objective qualities of a job and the subjective perspective of the employee.

Salancik and Pfeffer (1977) equated psychological states with job attitudes, and commented that the attitude-behaviour relationship was tenuous. In reply, Alderfer (1977) stressed that attitudes were not interchangeable with descriptive subjective experiences and with expressed preferences of job characteristics.

Roberts and Glick (1981) suggested that perceptions of task characteristics were merely perceptions, and did not represent the attributes of tasks. However, Griffin (1983) demonstrated that manipulations of objective task attributes influenced perceptions of

core task attributes. These results firmly refuted the claims of Roberts and Glick (1981) , and provided support for Hackman and Oldham's (1976) note that

> "... when it is the intent to predict or understand employee attitudes or behaviour at work ..., employee ratings of the job dimensions are preferable to use, since it is an employee's own perceptions of the objective job that is causal of his reactions to it" (Hackman and Oldham, 1976, p.261).

Other studies have demonstrated that task attributes are strongly influenced by social cues (Thomas and Griffin, 1983; Weiss and Shaw, 1979), and changing needs (Salancik and Pfeffer, 1977). The Job Characteristics Model (1980) successfully accounts for social influences through the moderating context satisfaction variables (which includes both co-worker and supervisory satisfactions). Changing needs can be accounted for by GNS, as need strength is not hypothesised to be static over time.

Over-reliance on self-report measures is a criticism made of the job characteristics literature (Aldag, Barr and Brief, 1981; Roberts and Glick, 1981; Schwab and Cummings, 1976). The JDS was originally designed to be used in conjunction with the Job Rating Form (JRF, Hackman and Oldham, 1974), with the JDS to be completed by employees and the JRF administered to supervisors and/or non-task performers. Direct comparisions could thereby be made among the perceptions of job encumbents, supervisors and outside observers.

Resulting correlation coefficients between the JDS and the JRF have been varied, but were predominantly indicative of convergent ratings. Oldham et al. (1976) reported a mean correlation of .85, indicating substantial agreement on the perception of job characteristics. Hackman and Lawler (1971) found correlations ranging from .65 to .87 for the dimensions variety, autonomy and identity between supervisor and employee ratings. The correlation coefficient for the characteristic feedback, defined in this study to include both feedback from the job itself and/or from some other person, was .09 (non-significant) between supervisors and workers.

Birnbaum, Farh and Wong (1986) concluded that, for their sample of 461 employees from 57 jobs, and 79 supervisors, data from the JRF provided a better fit to

the Job Characteristics Model, and may therefore be a better instrument for measuring job characteristics than the JDS. This conclusion was based on the finding that the JRF measures contained much less method variance and greater trait variance than the JDS measures did. It appears that in their sample the supervisors were better able to distinguish between job characteristics than were the job encumbents.

Birnbaum et al. (1986) criticised previous studies (Hackman and Lawler, 1971; Hackman and Oldham, 1975; Oldham et al. 1976) for reporting only correlations between employees and other raters' assessments of specific jobs, and recommended the use of more extensive data analysis.

A major theoretical problem of the Job Characteristics Model is that both the observations of the independent variables (task characteristics) and of the dependent variables (attitudes of task performers) are derived from the same source of information, usually the JDS (Algera, 1983; Roberts and Glick, 1981). This incurs the criticisms of common method variance in independent and dependent variables, multicollinearity and possible cognitive consistency in item response (Salancik and Pfeffer, 1977).

Several researchers have addressed the problems outlined above by collecting information on dependent and independent variables from different instruments and/or respondents, for example using different questionnaires, and obtaining two sources of perceptions (that is, those of job encumbents and non-task performers). Algera (1983) selected twenty-four task characteristics from the literature. The resulting correlations between task performers and observers for each task characteristic ranged from .21 to .77. Low convergence between the two types of ratings was ascribed to differences in perceptions between the two groups. The suggestion made by Salancik and Pfeffer (1977) that cognitive consistency within the individual could contribute to the relationships between task characteristics and reactions by task performers is refuted in this study, as scores on the task characteristics and the dependent variables come from different sources of information, non-task performers and task performers respectively.

In a move away from using purely perceptual measures, some researchers

compared more objective job analysis measures with job encumbent's perceptions. Dunham (1977) correlated JDS items with items from the Position Analysis Questionnaire (PAQ, McCormick et al. 1969). The study was of the self-report variety, as the job encumbents responded to both the JDS and the PAQ. The correlation coefficients between job complexity (a composite of variety, autonomy, identity, significance and feedback) and PAQ items ranged from .21 to .49 ($p < 0.01$). In a further study, Dunham, Pierce and Kolenko (1979, cited by Aldag et al. 1981) found that the PAQ explained over twice the variance in behavioual responses as did the JDS.

The objective and subjective approaches were linked again when Rousseau (1982) compared data from the Functional Job Analysis (Fine, 1968; Fine and Wiley, 1971) with job perceptions. Measures of job perceptions included autonomy, task significance, role conflict, role ambiguity and variety. Results indicated that skills involving working with data and, to a lesser extent, dealing with people, may have a substantial impact on an employee's work experience. This finding is in keeping with social-information processing theory results (Thomas and Griffin, 1983).

Research strategies in this area can be classified according to their *type of measure* (subjective, objective or both), *data source* (job encumbents, outside observers or both), and *measurement occasions* (single or multiple occasions) (Taber, Beehr and Walsh,1985). These authors suggest that an optimal research procedure comprises both subjective and objective assessment by task performers and non-task performers on more than one occasion. Taber et al. (1985) used an in-house performance evaluation system of an engineering manufacturing company (developed by the National Electrical Manufacturing Assn - NEMA, 1937; MIMA, 1974). The researchers formulated a self-rated job characteristic instrument consisting of items from the Yale Job Inventory (Hackman and Lawler, 1971), and from the Michigan Organisational Assessment Package (Nadler, 1975), and as well as measures of role clarity and perceived challenge.

Taber et al. (1985) reported a number of significant correlations among which were :

a) Experience with autonomy, variety, task identity and challenge;

b) Judgement and initiative with autonomy, variety, identity and challenge;

c) Training and knowledge with autonomy, variety, identity and challenge;
d) Precision and accuracy with variety and challenge;
e) Mental/visual concentration with identity and challenge;
f) Responsibility for equipment with autonomy, variety and challenge;
g) Responsibility for materials with variety and challenge;
h) Working conditions with identity.

However, the job evaluation components physical effort, responsibility for safety and job hazards did not directly correlate with any of the job characteristic variables, while the job characteristics job feedback, role clarity and supervisor feedback did not correlate with any of the job evaluation variables.

A canonical analysis, to evaluate the overlap of the underlying dimensions of the job characteristic and job evaluation measures, produced only one significant correlation. Taber et al. (1985) suggested that the canonical variable resembled the mental states construct hypothesised by Turner and Lawrence (1965) to underlie skill and knowledge and responsibility RTAs. It comprised correlations for : experience; judgement and initiative; training and knowledge; precision and accuracy; and perceived challenge. However the canonical weights were not stable across the two sub-samples because of the high degree of multicollinearity within both the job evaluation and the job characteristic indices, making interpretation difficult.

Taber et al. (1985) concluded that the job characteristic instrument used in their research was limited, and that the resulting data were probably conservative estimates of the size and number of associations between the psychological task attributes and more objective properties of jobs. The experimenters recommended the use of the JDS in future research.

In summary, the Job Characteristics Model as it stands does not clarify the relationship between the subjective and objective assessments of a job. Only one study in this area has addressed the relationship between objective *and* subjective (self-report) assessments with behavioural outcomes (Dunham, Pierce & Kolenko, 1979, in Aldag et al. 1981). Dunham et al. (1979) used the JDS and PAQ variables in separate regression statements to predict the JDS outcome variables. However, if the purpose of

the research was to explain a greater proportion of variance in the outcome variables then it would be advantageous to include both the job analysis dimensions and the job characteristics variables in each regression equation.

The relationships between objective and subjective perceptions have been discussed, and those between perceived job characteristics and personal and work outcomes have been identified. The link between these two research strategies is in need of further development.

Chapter Three

RATIONALE

The purpose of this study was to use an explorational approach to make an extensive test of the Job Characteristics Model (Roberts and Glick, 1981).

The Job Characteristics Model itself was evaluated from the following perspectives :

1) The dimensionality of the job characteristics was assessed (as recommended by Dunham et al.,1977; and Green et al., 1979) using confirmatory factor analysis (Fried and Ferris, 1986; Harvey et al., 1985). It was proposed that the resulting factor structure from this sample would be comparable with that of Fried and Ferris' (1986) highly educated, young (aged 20-29 years) subjects.

2) The moderating effects of GNS were assessed (Roberts and Glick, 1981) using hierarchical multiple regression (Arnold and House, 1980; Graen et al., 1986; Zedeck, 1971). Arnold and House tested the general applicability of the model by including only the job characteristics hypothesised for each psychological state in the prediction of the psychological states, and similarly in the prediction of the work and personal outcomes. The present research includes all possible variables in each prediction.

3) The predictor effects were assessed for :
(a) context satisfactions including : co-worker and supervisory satisfactions and physical working conditions;
(b) personal characteristics including : sex and age;
(c) knowledge and skill : number of years spent at university and whether or not the subject was majoring in psychology, and whether or not the subject had had

a full-time job;
(d) growth need strength.

The efficacy of each of the above hypothesised independent variables was assessed using step-wise multiple regression (Adler, Skov & Salvemini, 1985; Roberts & Glick, 1981). Personal and contextual variables and knowledge and skill were utilised as predictor variables only, as the number of possible combinations of each of these moderator variables was too large to permit exhaustive analysis.

4) The relationship between subjective perceptual indices and more objective job analyses was examined. Stage one students' evaluated their perceptions of the psychology course using the Job Diagnostic Survey (JDS, recommended use by Taber et al., 1985). Stage one supervisors rated the course using the Position Analysis Questionnaire (PAQ), and the Job Rating Form (JRF). That is, both subjective and more objective questionnaires were employed, and they were detailed by two sources of information or respondents (Algera, 1983), namely students and supervisors.

The two subjective measures, the JDS and the JRF, were compared with the PAQ. The purpose of this area of the study was to predict behavioural and personal outcomes in the Job Characteristics Model using the dimensions from both instruments with multiple regression. Dunham et al. (1979) reported that the PAQ dimensions explained twice as much variance in behavioural outcomes as the JDS. The present research replicated the incorporation of the PAQ with the JDS; but, instead of using the job analytic and self-rated job characteristics separately in the prediction of outcome variables, this research employs the variables in conjunction. In addition, three further variables were added to the model as detailed above (see below).

Several modifications to the Job Characteristics Model were felt to warrent inclusion in the present exploratory research. The variations are as follows :

1) Two additional psychological states, role clarity and peceived challenge, were proposed by Walsh, Taber and Beehr (1980). A path analysis revealed that challenge was consistently the most important determinant of job satisfaction, while role clarity appeared to be a necessary precondition of perceived challenge. The

two new variables significantly increased the explained variance of job satisfaction (the only outcome variable under investigation). The third additional variable, physical working conditions was hypothesised to be related to context satisfactions, and measures of working conditions were taken (recommended by Taber et al., 1985).

2) Satisfaction was suggested by the author to influence the relationships between the psychological states and outcome variables in the Job Characteristics Model. This argument was based on Socio-Information Processing Theory whereby employees' perceptions of their jobs, psychological states and personal and work outcomes are all influenced by their overall satisfaction with their jobs (Salancik and Pfeffer, 1978; Thomas and Griffin, 1983). This concept is similar to the satisfaction variable that has subsequently been proposed by Hogan and Martell (1987).

Satisfaction was hypothesised to influence the subjects' psychological states and also behavioural and affective responses to the job. Hogan and Morgan (1987) tested several variations of the Job Characteristics Model using structural equations analysis. These authors reported that the model without the latent variable provided a poorer fit of the data.

This writer suggests that the "black box" approach of placing an "unknown" and unquantifiable satisfaction measure in the model is not helpful. The author surmises that it is more appropriate to utilise the affective measures that are gathered in the JDS, that is, general satisfaction, growth satisfaction and internal work motivation as mediating satisfaction measures.

c) Attendance was reinstated as a work outcome in the model (Turner and Lawrence, 1965). It was suggested that attendance, as an objective measure may be related with the objective job analysis dimensions.

d) All the variables preceding the dependent variables in the revised model from top to bottom were included as independent variables in the prediction of the psychological states and personal and work outcome variables. The revised Job Characteristics Model was tested. A four tier model is hypothesised to replace the previous three tier model. The first level consists of the job characteristics, the job

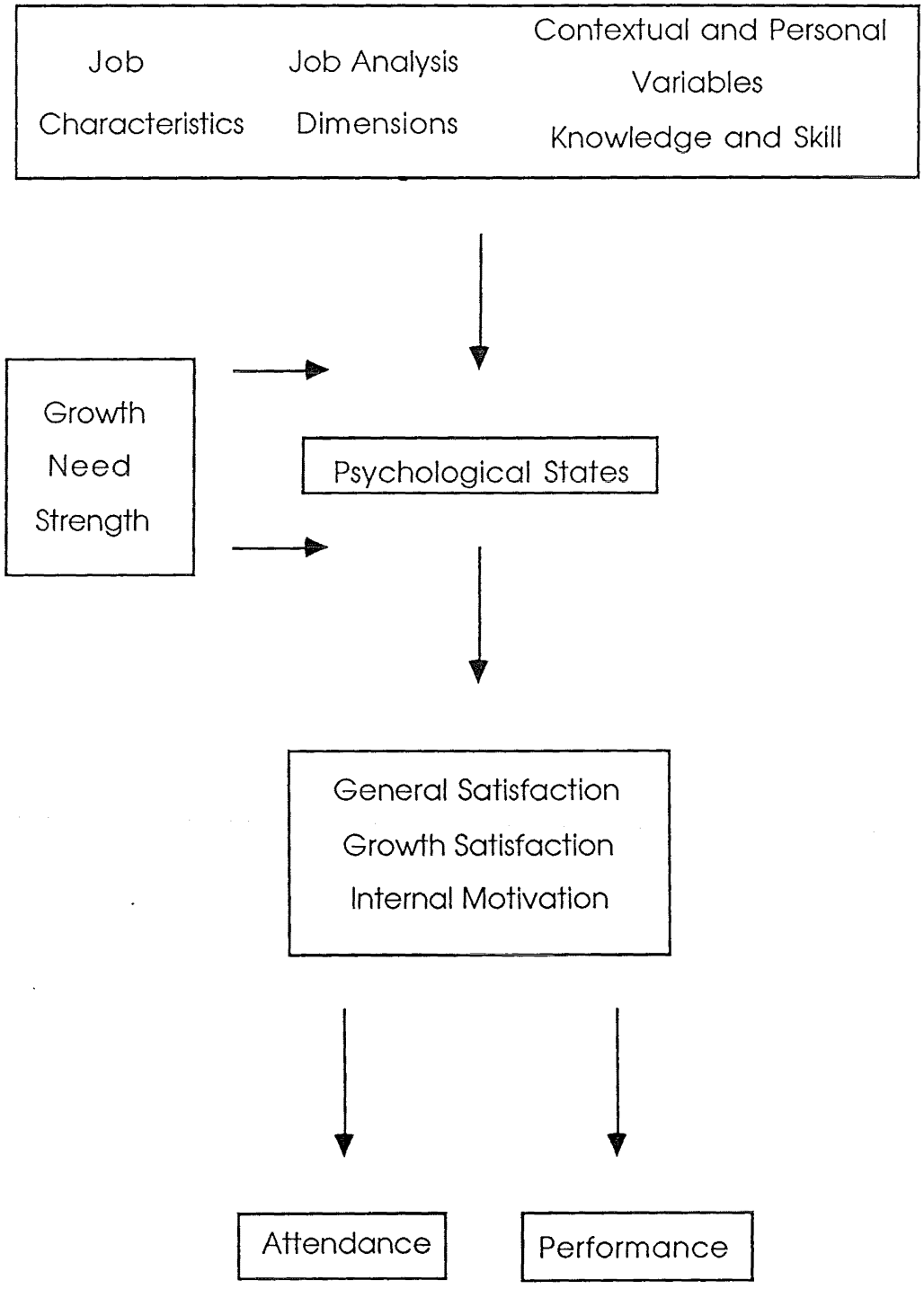


Figure 3. The Job Characteristics Model Tested in the Current Research

analysis dimensions and personal and contextual variables. The second comprises the psychological states. The third consists of the personal outcome variables, general satisfaction, growth satisfaction and internal motivation. The fourth level consists of the work outcome variables, attendance and work performance. (See Figure 3 for the revised model). The original model as such, then, was not tested in that variables other than the five job characteristics were utilised as potential predictor variables.

Job Analysis

Job analysis is defined as the

> "...process of systematic and logical examination of a job in detail sufficient to identify the nature, component tasks, other job content information, demands on the job holder and other modified factors relative to the purpose of the analysis" (Torrington and Chapman, 1983, p. 366).

Jobs can be described objectively with standard checklists. Aldag, Barr and Brief (1981) recommend the use of the Position Analysis Questionnaire (PAQ, McCormick, 1976). The PAQ is the most frequently used job analysis instrument in the published literature (Cornelius, 1987, as cited by De Nisi, Cornelius and Blencoe, 1987).

McCormick et al. (1969, 1976) hypothesised that work has an underlying structure which can be quantified in the way that specific units or elements of job-related variables are organised across jobs. Jobs can be described in terms of a combination of units. The PAQ is based on 194 job elements, which are classified into six major dimensions which include : Information Input, Mental Processes, Work Output, Relationships with Other Persons, Job Context and Other Job Characteristics. The job analyst rates the job on each of the 194 elements using six point scales (0-5), in terms of : extent of use, amount of time, importance to the job, possibility of occurance and applicability (McCormick, 1969). The job is then described in terms of the scores obtained for each of the six dimensions. The PAQ has been shown to have good test-retest reliability (average $r = .78$) over time (ninety days) and good reliability between job analysts, supervisors and incumbents (average $r = .79$) (McCormick et al.,

1972), and is said to be one of the most rigorously developed, well-evaluated and generally useful job analysis instruments available (Harvey & Hayes, 1986). PAQ ratings should be obtained from several job analysts and then averaged (Tenopyr and Oeltjen, 1982).

> In his extensive review, Landy (1985, p.155) commented that the PAQ is "an excellent example of worker-oriented assessed job statements...".

Student Samples

Undergraduate students have frequently been employed in the experiments of researchers and this has occurred in job characteristics research. Farh and Scott (1983), for example, used sixty students in their assessment of the effects of autonomy on performance. Simulated work or tasks in laboratories are again frequently implemented in research although this results in the findings having limited external validity.

This current research utilized a student population. However, the task under evaluation was the first year introductory psychology university course in which the students were enrolled. This, in comparison with Farh and Scott's study, had the advantages of : a) the task being non-contrived; b) the task had temporal duration in that it lasted for the university year; and c) the sample had ongoing co-worker (or co-student) and supervisor working relationships.

Chapter Four

METHODOLOGY

Subjects

Three groups of subjects were involved in the research. The first sample (n=328) comprised one hundred and eighty female and one hundred and forty-eight male stage one psychology students. The ages of the subjects when the data were collected can be seen in Table 2.

Table 2. Ages of the Student Sample.

Age	*Number of Students*	*Percentage of Sample*
Under 20 years	252	77
20 - 25 years	44	13
26 - 30 years	11	3
31 - 35 years	11	3
36 - 40 years	7	2
41 years and over	3	1

Two hundred and eighteen subjects (66%) were in their first university year. Eighty-six subjects (26%) were in their second year, sixteen in their third year, seven in their fourth year and one subject was a fifth year student.

Forty-one percent of the students (n=133) stated that they intended to major in

psychology at university, 47% stated that they did not intend to major in psychology (n=153) and 12% were undecided (n=42).

The majority of the sample (n=190, 58%) had not held full-time paid employment for a period greater than three months, that is, a job lasting longer than the usual summer vacation. One hundred and thirty-eight students (42%) stated that they had held a position for more than three months.

Each subject in this first group rated his or her work using the Job Diagnostic Survey.

The second subject group were five teaching fellows, comprising four females and one male. The duties of a teaching fellow include a moderate amount of teaching of typically two or three laboratory groups in introductory psychology courses. Teaching fellows are usually enrolled post-graduate students. The teaching fellows were instructed in the use of job analysis and completed the Position Analysis Qustionnaire measure.

The third group comprised twelve stage one psychology laboratory tutors included among whom were the five teaching fellows in group two. This group completed the Job Rating Form.

THE RESEARCH INSTRUMENTS

The three research instruments were :

1. The Job Diagnostic Survey

The Job Diagnostic Survey (JDS) (Hackman and Oldham, 1974,1975) is an instrument designed as part of a multiple-method analysis of work. The JDS can be used to analyse existing jobs prior to work redesign, and also to assess the effects of work redesign, as perceived by the job incumbent.

The job incumbent rates his or her own job on : measures of various job characteristics (skill variety, task identity, task significance, autonomy and job feedback); an assessment of three psychological states regarding the job (experienced meaningfulness of the work, experienced responsibility for work outcomes, and knowledge of results from work); personal and work outcomes (general satisfaction, internal work motivation, growth satisfaction); and the strength of the job incumbent's desire to obtain "growth" satisfactions from his or her work. One should note that work attendance and performance were hypothesised as outcomes in the 1975 Job Characteristics Model but measures of these variables were not assessed by the JDS.

The specific variables obtained from the JDS are described below.

1) JOB DIMENSIONS The JDS provides measures of the five core dimensions in the Job Characteristics Model, defined as follows :

(a) *Skill variety* The degree to which a job requires a variety of different activities in carrying out the work, involving the use of a number of different skills and talents of the person.
(b) *Task identity* The degree to which a job requires completion of a "whole" and identifiable piece of work, that is, doing a job from beginning to end with a visible outcome.
(c) *Task significance* The degree to which the job has a substantial impact on the lives of other people, whether those people are in the immediate organisation or in the world at large.
(d) *Autonomy* The degree to which the job provides substantial freedom, independence and discretion to the individual in scheduling the work and in determining the procedures to be used in carrying out the work.
(e) *Job feedback* The degree to which carrying out the work activities required by the job provides the individual with direct and clear information about the effectiveness of his or her performance.

In addition, measures are obtained for two further dimensions which have been

found to be helpful in understanding jobs and employees' reactions to them.
These are : (a) *Feedback from agents* The degree to which the employee receives clear information about his or her performance from supervisors or from co-workers.

(b) *Dealing with others* The degree to which the job requires employees to work closely with other people in carrying out the work activities (including dealings with other organisational members and with external organisational "clients").

2) CRITICAL PSYCHOLOGICAL STATES The JDS provides measures of each of the three psychological states which Hackman and Oldham postulate mediate the relationship between the core job dimensions and the outcomes of work. These are :

(a) *Experienced Meaningfulness of the work* The degree to which the employee experiences the job as one which is generally meaningful, valuable and worthwhile.

(b) *Experienced Responsibility for work outcomes* The degree to which the employee feels personally accountable and responsible for the results of the work he or she does.

(c) *Knowledge of Results* The degree to which the employee knows and understands, on a continuous basis, how effectively he or she is performing the job.

3) WORK and PERSONAL OUTCOMES The JDS provides measures of a number of personal, affective reactions which a person obtains from performing the job. These are :

(a) *General satisfaction* An overall measure of the degree to which the employee is satisfied and happy with the job.

(b) *Growth satisfaction* The degree to which the employee is satisfied with the opportunities for personal growth and development on the job.

(c) *Internal work motivation* The degree to which the employee is self-motivated to perform effectively on the job. That is, the degree to which the employee experiences positive internal feelings when working well on the

job, and negative internal feelings when doing poorly.

4) MODERATOR VARIABLES These are variables that *moderate* the relationships between the core job dimensions and the psychological states and the outcome variables. They include :

(a) *Individual Growth Need Strength* The JDS taps the strength of the respondent's desire to obtain "growth" satisfactions from his or her work. This measure is viewed as a malleable individual difference characteristic which is predicted to affect how positively an employee will respond to a job with high motivating potential. Growth need strength (GNS) is measured in two separate sections of the instrument. In the "would like" section, respondents are asked to indicate the degree to which they would like growth relevant conditions such as opportunities to learn new things and opportunities to be creative and imaginative to be present in their work. In the "job choice" section, respondents are asked to indicate their relative preferences from pairs of hypothetical jobs. In each item a job with characteristics relevant to GNS is paired with a job which has the potential for satisfying one of a variety of other needs (e.g., social satisfaction).

(b) *Context satisfactions* For these specific satisfactions, respondents report directly how satisfied (or dissatisfied) they are with various aspects of their jobs. These are :

i) *Social satisfaction* The degree to which the respondent is satisfied (or dissatisfied) with his or her peers and co-workers.

ii) *Supervisor satisfaction* The degree to which the respondent is satisfied (or dissatisfied) with his or her supervisor.

iii) *Physical Working Conditions* This is discussed below. (See sub-section (5) New Variables).

(c) *Personal variables* These include subject age and sex.

(d) *Knowledge and Skill* Measures assessing knowledge and skill include : number of years that the subject has spent at university, whether or not the subject has had a permanent job and whether or not the subject is majoring in psychology.

Modifications to the JDS

It was necessary to modify some of the measures in the JDS to encompass the university context. The final form of the JDS can be seen in Appendix A. Changes to the JDS are detailed in Appendix B.

5) NEW VARIABLES Three new measures were added to the JDS. Role clarity and challenge were added to the three existing psychological states and physical working conditions was included with the other contextual moderator variables (as recommended by Taber, Walsh & Beehr, 1980).

a) *Role clarity* This variable was measured by three items from the Michigan Organisational Assessment Questionnaire (Cammann, Fichman, Jenkins and Klesh, 1979; Seashore, Lawler, Mirvis and Cammann, 1982). Some alterations were also necessary to those items. (See Appendix B for details).

b) *Challenge* This variable was measured by four items from the Michigan Organisational Assessment Questionnaire (1979,1982). Modifications to those items are detailed in Appendix B.

c) *Physical working conditions* This variable was assessed using three measures from the Index of Organisational Reactions (Smith, 1962,1976). Modifications to those items are detailed in Appendix B.

The questionnaire was examined and pilot tested with several students before its form was finalised. The modified version of the JDS was administered to a group of fourteen stage one psychology students. Instructions given to this group were identical with those given to the final sample. As the JDS is a well established instrument, the focus of the pilot study was on the comprehensibility of the instructions (in particular, the biodata section); the completion time and the applicability of the JDS to the university work setting. The age range was divided further from ten year categories to five year categories as a result of the pilot study, as all fourteen subjects fell into either of the categories under twenty years, or twenty to thirty years. This group of students was excluded from the final sample. The final form of the research instrument can be seen in Appendix A.

2. The Job Rating Form (Hackman and Oldham, 1975).

The Job Rating Form (JRF), a companion instrument to the JDS, was designed for the use in obtaining assessments of jobs by supervisors or outside observers who do not work on the focal job. Except for the instructions and minor rewordings of the items (e.g., changing "your job" to "the job"), the JRF is identical to Sections one and two of the JDS. This permits direct quantitative comparisons to be made between assessments made of job characteristics by the people who do the job, the supervisors and outside observers.

Some modifications were made to the JRF, these are detailed in Appendix D. The additional variables role clarity, challenge and working conditions were also included in the JRF. The final form of the JRF can be seen in Appendix C. In the pilot test the JRF was administered to a group of stage two psychology tutors. As the JRF is a well established instrument, the focus of the pilot test was on the comprehensibility of the instructions and on the applicability of the JRF to the university work setting. Findings from the pilot study indicated that the JRF was able to be applied to the university context with no apparent problems. However, it was suggested by the tutors that it was difficult not to rate their own work, rather than that of their tutor group. As a result of this comment, it was stressed when the JRF was administered to the stage one tutors that the tutors were to rate the students' course work, and not their own as tutors.

3. The Position Analysis Questionnaire (McCormick, Jeanneret and Mecham, 1969).

The Position Analysis Questionnaire (PAQ) is a structured job analysis questionnaire that can be used for analysing positions or jobs of many different types. On the basis of the analysis of any given position/job it is possible to compute statistically-derived job dimension scores with the PAQ, thus making it possible to relate positions or jobs to each other on the basis of such job dimension scores.

The questionnaire is divided into six major dimensions :

1) *Information input* Where and how does the worker get the information the he or she uses in performing his or her job?

2) *Mental processes* What reasoning, decision-making, planning, and information processing activities are involved in performing the job?

3) *Work output* What physical activities does the worker perform and what tools or devices does he or she use?

4) *Relationships with other persons* What relationships with other people are required in performing the job?

5) *Job context* In what physical and social contexts is the work performed?

6) *Other characteristics* What activities, conditions, or characteristics other than those described above are relevant to the job?

The six dimensions that are listed above are further divided into sections and subsections. Each section or subsection is made up of a group of related job elements. Each job element describes some general work activity, work condition or job characteristic. In most cases, examples are given to illustrate the 'central idea' of the job element. Modifications which were made to the PAQ are detailed in Appendix F. The final form of the PAQ can be seen in Appendix E.

PROCEDURE

As part of their course requirements, Stage One Psychology students must attend and participate in 22 laboratory sessions during the university year, in addition to attending three lectures per week. Each laboratory session carries the requirement of a written report (submitted at quarterly intervals). The laboratory work itself is varied, encompassing field and experimental work. These exercises culminate in small group discussions (three or four students) and a report to the larger laboratory group. The same tutor supervises each larger group of up to 18 students for the year. Each group remains together throughout the year. In this way, the lab work undertaken by the

students, together with lectures, is said to simulate work in the wider community.

Performance measures were taken at several different intervals during the year, these assessments were meaningful to the student as the scores contribute to their final grade. Thirty percent of the year's work for stage one psychology students was assessed in a mid-year exam. A further ten percent of the year's work was assessed in a mid-year statistics exam. The first lab book was handed in on the sixteenth of June, and the second was due on the fourth of August. Each of the lab books accounted for five percent of the year's work.

Data were collected from the student population during the thirteenth laboratory session, i.e., just after the mid point of the univeristy year. The researcher attended each of the twelve laboratory groups throughout that week, explained the purpose of the research and instructed the subjects on how to complete the questionnaire. The instructions were uniform over the twelve groups. After a general introduction from the resident teaching fellow, the researcher said :

> "I am a Stage One Psychology tutor, and I'm interested in your reactions and feelings towards this course, in particular, to your course work. The flow of information and communication is usually one-way at first year level, from lecturers and tutors to you. This is your chance to have your say. Please fill out the questionnaire honestly, evaluating your course work as you see it. Please keep in mind that your course work includes attendance at lectures and lab sessions, writing lab reports and essays, a statistics test, a mid-year and a final exam. Later in the year I'll put the results of this exercise on your notice board. It should take about twenty five minutes to complete the form. Thank you".

Three hundred and twenty-eight students attended their lab groups the week data were collected (out of a total of 429 enrolled for the course). Subjects were required to write their names on their own questionnaires, although this is not recommended by Hackman and Oldham. Subject identification was necessary for the researcher to match other variables with responses to the questionnaire. These other variables included a measure of lab attendance (taken over twenty sessions), and

performance measures.

The second sample, the stage one Psychology tutors, completed the JRF in the same week as the students. Instructions given to this group were briefer than those to the first group. The main emphasis made to the tutor group was that they were to remember that they were to rate the students' course work, not their own work as tutors. The tutors were also instructed to keep in mind the course requirements placed on the students. These were stipulated in the introduction to the JRF.

The PAQ was completed by the teaching fellows in their own time, over a one week period. Each fellow was approached individually, and instructed in the job analysis procedure. The subject familiarized himself or herself with the PAQ in the presence of the researcher. The researcher drew attention to the job elements, and to the various rating scales that are used with the individual job elements. The analyst was instructed to select the rating scale value which he or she considered to be most appropriate for the stage one Psychology course work, considering the concept reflected by the job element itself, and the type of rating scale that is provided for use with that element. Each subject was informed that in any position or job there will be many job elements that do not apply. In such instances they were instructed to mark N (Does not apply). The questionnaire was collected one week after it had been issued.

ASSESSMENT OF PERFORMANCE

The performance variable is an outcome hypothesised by Hackman and Oldham (1975) to result from an interaction between the job dimensions, psychological states and various moderator variables. Student performance included a variety of measures, each selected because it contributed to the final course grade.

Measures contributing fifty percent to the final course grade were available at the time of this research. This included the mid-year exam mark (worth 30%), the statistics exam mark (worth 10%) and two lab books (worth 5% each). To attain a meaningful value for each subject, his or her scores for each of the above course requirements were weighted by the amount each contributed to the final grade. E.g., The mid-year

exam mark was multiplied by .30. The computation of the performance index was :

Performance = ((Mid-year exam mark x .30) + (Statistics test mark x .10) + (Lab book 1 x .05) + (Lab book 2 x .05)).

Chapter Five

RESULTS

Five analyses of the data were carried out. In order of presentation they are :

(1) A factor analysis was performed to assess the dimensionality of the job characteristics.

(2) Means of the JDS and JRF are presented to enable comparison between self- and supervisor-rated perceptions of job characteristics.

(3) Simple correlations were performed with-in and between the JDS, JRF and PAQ dimensions.

(4) Hierarchical multiple regression was used to examine the moderating effects of growth need strength (Zedeck, 1971).

(5) Multiple regression was used to assess :

(a) the hypothesis that the model is more efficacious for high GNS subjects;

(b) the predictor effects of contextual and personal variables and knowledge and skill;

(c) the effectiveness of the objective job analysis dimensions in the prediction of the psychological states and outcome variables;

(d) the usefulness of the two additional psychological states, challenge and role clarity.

1. DIMENSIONALITY OF THE JOB CHARACTERISTICS

The results of the confirmatory factor analysis on the student sample's JDS responses, assessing the dimensionality of the Job Characteristics Model, produced a "good" fit for the five-factor solution (i.e., some factors were perfectly reproduced but two factors were defined by just two items). The factor analytic solution is presented in Table 3.

The five-factor solution reproduced the a priori structure for task identity, job feedback and autonomy. A fourth factor was defined by two task significance items (instead of three). However, the relatively low significance loading (.28) for item three supports the strong loadings of the other significant items (.73, .74) for the task significance factor. A fifth factor was defined by two variety items (instead of three). One a priori variety item (item 1) is loaded on factor three, defined by three a priori autonomy items.

In summary, there was a good fit to the a priori five factor solution for the dimensionality of the job characteristics.

Table 3. Five-Factor Solution for the Job Characteristics.

	Factor					*Communality*
JDS Items 1	*1*	*2*	*3*	*4*	*5*	
Skill Variety						
Item 1	.009	.224	.279	.133	.196	.185
Item 2	.088	.134	.114	.067	.629	.440
Item 3	.017	.124	.118	.114	.510	.303
Task Identity						
Item 1	.825	.089	.090	.086	.023	.705
Item 2	.748	.096	.072	.049	.103	.588
Item 3	.582	.144	.044	-.076	.065	.371
Task Significance						
Item 1	-.029	.124	.170	.740	.170	.622
Item 2	.011	.121	.008	.735	.039	.557
Item 3	.174	.122	.224	.284	.220	.225
Autonomy						
Item 1	-.028	.093	.779	.061	-.045	.622
Item 2	.084	.151	.534	.057	.205	.361
Item 3	.183	.098	.549	.073	.181	.383
Job Feedback						
Item 1	.077	.747	.187	.113	.094	.621
Item 2	.176	.661	.098	.168	.148	.528
Item 3	.126	.551	.108	.051	.128	.351

1. JDS = Job Diagnostic Survey.

Note : Loadings of $\pm$ .50 and above were used to define factors.

2. DESCRIPTIVE STATISTICS

Table 4 reports means and standard deviations from the sample on the job dimensions, psychological states, personal and work outcomes, and GNS measures. Norms for the JDS are also reported. Comparison of the sample with the normative data indicates that the current sample was not unrepresentative in terms of average response or degree of variability, with the possible exception of job choice GNS which had a .98 difference between norm and sample. Slight variability with the normative data was found for autonomy (.41) and job feedback (.63).

Responses to the questions : "Do you like the psychology course?", "Have you handed-in your lab book?" and "Have you had your lab book returned to you, marked?" failed to discriminate between subjects. These variables were therefore not included in any further analyses.

Table 4. Descriptive Statistics of the Job Diagnostic Survey.

	Current Study		*Norms* [a]		*JRF*	
	M	*SD*	*M*	*SD*	*M*	*SD*
Job Characteristics						
Skill Variety	4.27	1.03	4.66	1.22	5.11	0.92
Task Identity	4.65	1.23	4.71	1.25	3.64	0.83
Task Significance	5.51	1.06	5.51	1.09	5.87	1.21
Autonomy	4.29	1.12	4.87	1.17	4.37	1.13
Job Feedback	4.07	1.16	4.87	1.21	4.41	0.78
Psychological States						
Experienced Meaningfulness	4.93	0.94	5.15	0.97		
Experienced Responsibility	5.21	0.70	5.46	0.82		
Knowledge of Results	4.47	1.11	5.00	1.03		
Role Clarity	6.38	0.75			6.32	0.46
Challenge	4.23	0.99			4.95	0.61
Outcome Variables						
Internal Motivation	5.33	0.81	5.58	0.77		
General Satisfaction	5.27	0.78	4.70	1.07		
Growth Satisfaction	5.10	0.82	4.83	1.15		
Work Performance	35.49	9.35				
Attendance	17.60	32.27				
Growth Need Strength						
"Would Like" format	5.49	0.77	5.70	1.05		
"Job Choice" format	3.34	0.55	4.32	1.15		

Sample Size varied from 317 to 328, depending on missing data.

[a] Cited in Arnold and House (1980).

3. SIMPLE CORRELATIONS

Correlation coefficients among job characteristics, psychological states and outcomes are presented in Tables 5 and 6. Discrepancies in these data from those reported by Hackman and Oldham (1975) are two-fold.

First, for this sample, correlations between task identity and internal motivation, and between task identity and work responsibility were not significant. Secondly, significant correlations were found between both knowledge of results and variety, and task identity and autonomy, where Hackman and Oldham (1975) had reported insignificant correlations. Role clarity and perceived challenge acted in a similar manner as the other psychological states in their correlations with the job characteristics and the outcomes. The one exception was the significant correlation between role clarity and work performance. This was the *only* significant correlation with work performance.

Correlation coefficients between the job characteristics and psychological states are moderate and significant. The coefficient that exceeds the others is the relationship between challenge and skill variety (.60). The relationships between identity with work responsibility and autonomy with role clarity are insignificant.

General satisfaction and growth satisfaction were significantly correlated with all of the psychological states and job characteristics. Internal motivation correlated with all but knowledge of results and task identity. The exceptions are counter-intuitive. Correlations between general satisfaction and work meaningfulness, growth satisfaction and work meaningfulness, and growth satisfaction and challenge are notably high. The work outcomes were independent of the psychological states and job characteristics. Attendance did not correlate significantly with any of the variables. Performance correlated only with role clarity.

Table 5. Correlations between the Job Characteristics, the Psychological States and the Outcome Variables

	Job Characteristics				
	SV	*ID*	*TS*	*AU*	*FB*
Job Characteristics					
Skill Variety	-				
Task Identity	.14*	-			
Task Significance	.31**	.10	-		
Autonomy	.28**	.18**	.24**	-	
Job Feedback	.35**	.23**	.33**	.33**	-
Psychological States					
Work Meaningfulness	.40**	.20**	.36**	.23**	.32**
Work Responsibility	.23**	.03	.23**	.23**	.28**
Knowledge of Results	.15**	.16**	.11*	.18**	.52**
Challenge	.60**	.22**	.34**	.34**	.38**
Role Clarity	.12*	.24**	.25**	.09	.23**
Outcome Variables					
Internal Motivation	.32**	.08	.35**	.17**	.18**
General Satisfaction	.23**	.18**	.19**	.15**	.25**
Growth Satisfaction	.47**	.18**	.33**	.38**	.35**
Performance	-.01	-.06	.07	-.09	.03
Attendance	-.02	-.04	.03	-.06	-.05

(*SV*) Skill Variety; (*ID*) Task Identity; (*TS*) Task Significance; (*AU*) Autonomy; (*FB*) Job Feedback.

**$p \leq .01$; * $p \leq .05$; (two-tailed test).

Table 6. Correlation Coefficients Between Psychological States and Outcome Variables.

	Outcome Variables				
	IWM	*GS*	*GRS*	*P*	*A*
Psychological States					
Work Meaningfulness	.35**	.50**	.56**	-.00	.06
Work Responsibility	.32**	.24**	.25**	-.02	.03
Knowledge of Results	.00	.21**	.20**	.05	-.05
Challenge	.39**	.29**	.61**	-.05	-.01
Role Clarity	.17**	.22**	.21**	.17**	.09

(*IWM*) Internal Work Motivation; (*GS*) General Satisfaction; (*GRS*) Growth Satisfaction; (*P*) Performance; (*A*) Attendance.
**p ≤ .01; *p ≤ .05; (two-tailed test).

Tables 7 and 8 present the correlation coefficients between the subjects' and the supervisors' ratings of job characteristics. For comparative purposes supervisor ratings for both the JRF and the PAQ were weighted by the number of subjects each tutor supervised. The weighting for each tutor was calculated by the following equation :

$$\text{Supervisor Ratings}_j = \text{Number of Subjects Supervised}_j \times \text{Raw Ratings}_j,$$

where 'j' stands for each supervisor.

Not one of the JDS dimensions significantly correlated with its JRF counterpart. Inter-correlations among both the JDS and the JRF dimensions were significant but low. Correlations between the JRF variables and the psychological states and outcome variables were small and seldom significant. Table 8 presents the correlation coefficients between the job characteristics as rated by both the subjects and the supervisors with the PAQ dimensions. There were small but significant correlations between job context and the self-rated job characteristics (JDS). There were few

Table 7. Correlation Coefficients Between the JRF Variables and Job Characteristic Variables.

	Job Characteristics (JRF)				
	SV	*AU*	*ID*	*TS*	*FB*
Job Characteristics (JRF)					
Skill Variety	-				
Task Identity	.32**	-			
Task Significance	-.10*	-.03	-		
Autonomy	.32**	.25**	.14*	-	
Job Feedback	.28**	.58**	-.25**	-.01	-
Job Characteristics (JDS)					
Skill Variety	-.04	-.01	.02	-.06	.06
Task Identity	.03	.10	-.02	-.02	.00
Task Significance	.02	-.00	-.03	.05	.01
Autonomy	.02	.04	.13*	.05	.04
Job Feedback	-.01	.02	-.04	-.02	-.01
Psychological States					
Work Meaningfulness	.07	-.08	-.03	-.05	-.00
Work Responsibility	.10	.02	.09	-.06	.02
Knowledge of Results	.04	-.11*	.02	.07	.00
Challenge	.10	-.04	-.05	.04	.07
Role Clarity	.15**	.01	-.01	.01	-.02
Outcome Variables					
Internal Motivation	-.04	-.04	-.08	-.10*	.01
General Satisfaction	.05	-.12*	-.03	.07	-.03
Growth Satisfaction	.04	-.06	-.12*	-.06	.01
Performance	-.02	-.03	.03	.02	.00
Attendance	-.01	-.02	.00	.03	-.02

(*SV*) Skill Variety; (*AU*) Autonomy; (*ID*) Task Identity; (*TS*) Task Significance; (*FB*) Job Feedback.

**$p \leq .01$; *$p \leq .05$; (two-tailed test).

Table 8. Correlation Coefficients Between the PAQ Dimensions and the Variables from the Job Characteristic Model.

	Job Analysis (PAQ) Dimensions					
	II	*MP*	*WO*	*RO*	*JC*	*OJ*
Job Analysis Dimensions						
Information Input	-					
Mental Processes	.73**	-				
Work Output	-.48**	-.11*	-			
Relationships with Others	-.51**	-.31**	-.27**	-		
Work Context	-.36**	-.18**	.44**	-.11*	-	
Other JCs	-.85**	-.42**	.29**	.82**	.18**	-
Job Characteristics						
Skill Variety	.11*	.04	.00	-.14*	.14**	-.14**
Task Identity	-.06	-.04	.08	.01	.15**	.05
Task Significance	-.07	-.00	.11*	-.00	.17**	.06
Autonomy	.10	.06	-.05	-.04	.01	-.08
Job Feedback	-.01	-.02	.05	-.06	.10*	-.02
Psychological States						
Work Meaningfulness	-.01	-.01	.05	-.07	.17**	-.03
Work Responsibility	.00	.01	.04	-.06	.11*	-.03
Knowledge of Results	-.03	-.03	.06	-.08	.15**	-.02
Challange	.07	.05	.07	-.13*	.14**	-.09
Role Clarity	-.02	-.04	.04	-.05	.14*	-.02
Outcome Variables						
Internal Motivation	-.05	.01	.12*	-.02	.24**	.04
General Satisfaction	-.00	-.06	.10*	-.12*	.12*	-.06
Growth Satisfaction	.03	-.02	.00	-.09	.23**	-.08
Performance	.00	-.01	.05	-.03	.04	-.01
Attendance	.01	-.12	.03	-.03	.09	-.04
Job Rating Form						
Skill Variety	.07	.22**	.23**	-.36**	.20**	-.18**
Task Identity	.19**	.11*	-.13*	-.21**	.02	-.26**
Task Significance	.27**	-.01	-.23**	-.32**	-.12*	-.43**
Autonomy	-.24**	-.05	.39**	-.32**	.33**	-.01
Job Feedback	.15**	.02	-.44**	.07	-.08	-.14**

(*II*) Information Input; (*MP*) Mental Processes; (*WO*) Work Output; (*RO*) Relationships with Others; (*JC*) Job Context; (*OJ*) Other Job Characteristics. (*JC*) Job Characteristics.
**$p \leq .01$; *$p \leq .05$; (two-tailed test).

significant correlations between information input, work output, relationships with other persons and other job characteristics with the self-rated job characteristics (JDS). Small but significant correlations were found between job context and all of the psychological states, and between relationships with others and challenge. Job context correlated with each of the personal outcome variables, and significant correlations were also found between work output, relationships with others and general satisfaction and work motivation.

The supervisor-rated job characteristics (JRF) demonstrated a greater overall relationship with the objective PAQ dimensions. As can be seen in Table 8, information input, work output, relationships with other persons and other job characteristics show several moderate correlations with the supervisor-rated job characteristics. Mental processes and job context correlated significantly with some of the supervisor-rated job characteristics.

The job analysis dimensions intercorrelations were relatively high and mainly negative.

In summary, the relationships between the supervisor-rated job characteristics (JRF) were closer to the job analysis PAQ dimensions than they were to the self-rated job characteristics (JDS). Correlations between the supervisor-rated job characteristics and the job analysis PAQ dimensions were stronger than those between the PAQ dimensions and the self-rated job characteristics.

4. NEED STRENGTH AS A MODERATOR VARIABLE

The potential moderating function of need strength was examined using the following regression statements (Zedeck, 1971) :

(1) $Y = a + B_1X_1$

(2) $Y = a + B_1X_1 + B_2Z_1$

(3) $Y = a + B_1X_1 + B_2Z_1 + B_3X_1Z_1$,

where X_1 = the predictor (independent) variable, Z_1 = the hypothesised moderator variable and X_1Z_1 = the cross-product term, which actually carries the moderating effect. If equations 2 and 3 are significantly different from equation 1, but not from each other then the variable is an independent predictor, and *not* a moderator variable. A hierarchical test was used to test whether or not equations 1, 2 and 3 were significantly different from each other (Nie, Hull, Jenkins, Steinbrenner and Bent, 1975) for both the psychological states and outcome variables.

i) PSYCHOLOGICAL STATES For each of the job characteristic - psychological states relationships, the psychological states were first regressed on the job characteristics, context and personal variables, knowledge and skill and the objective job analysis dimensions, using step-wise forward inclusion regression on the whole sample. The insignificant variables were discarded. In the second step, each psychological state was regressed on the significant predictor variables and the "would like" format of GNS. Thirdly, each psychological state was regressed on the significant predictors, the GNS measure and the product of each predictor multiplied by GNS.

No support was found for the hypothesis that GNS moderates the job characteristics-psychological states relationships (See Table 9). Minimal increases in the R^2 value ranged from .001 to .013.

ii) OUTCOME VARIABLES The personal outcome variables were separately regressed on the job characteristics, contextual and personal variables, knowledge

Table 9. Hierarchical Regression Assessing the Efficacy of GNS as a Moderator Variable

R^2 for Psychological States and Outcome Variables

	Level 1	*Level 2*	*Level 3*
Psychological States			
Work Meaningfulness	.29	.29	.31
Work Responsibility	.14	.14	.14
Knowledge of Results	.36	.36	.37
Challenge	.47	.47	.48
Role clarity	.19	.19	.19
Outcome Variables			
Internal Motivation	.30	.31	.31
General Satisfaction	.31	.31	.31
Growth Satisfaction	.57	.57	.58
Performance	.15	.16	.16
Attendance	.08	.08	.12†

(Level 1) Significant independent variables selected by step-wise regression; (Level 2) Independent variables, 'liked GNS'; (Level 3) Independent Variables, 'liked GNS', independent variables x 'liked' GNS. † The change in the R^2 value from levels 1 and 2 to level 3 was significant ($p \leq .01$).

and skill and the objective job analysis dimensions and the psychological states using step-wise forward inclusion regression on the whole sample. The insignificant variables were discarded. In the second step, each outcome variable was regressed on the significant predictor variables and the "would like" format of GNS. Thirdly, each outcome variable was regressed on the significant predictors, GNS and the product of each predictor multiplied by GNS.

The work outcome variables were regressed on all the variables which preceded them in the model (see Figure 3), i.e., the personal outcome variables were also independent variables. No variables were found to significantly predict high or low GNS performance. The R^2 value was low (.13) for the medium GNS group. For that reason, on an a posteriori basis, attendance was employed as an independent variable in the prediction of performance.

Need strength was found to moderate between attendance and the independent variables. No support was found for the hypothesis that GNS moderates the psychological states - personal outcomes and work performance relationships (See Table 9). Minimal increases in the R^2 value ranged from .008 to .04.

5. MULTIPLE REGRESSION

Forward step-wise inclusion regression (Nie et al., 1975) was utilised in the prediction of both psychological states and the outcome variables. The criterion for inclusion was that each new variable had to make a significant contribution to the R^2 value, ($n = 120$, df 1, $F = 3.92$, $p < .05$). Separate regressions were performed for each of the high, medium and low GNS subject groups. The "would like" GNS format was utilised to score the subjects' need strength levels, and to trichotomise the subject pool into three GNS levels : high, medium and low GNS.

Predictor variables for the psychological states were selected by multiple regression from the following independent variables : the job characteristic

dimensions, dealing with others, feedback from agents, MPS, job choice GNS and the predicted personal and contextual moderator and knowledge and skill variables (including sex, age, full-time job, years spent at university, psychology major, social and supervisory satisfaction and physical working conditions), and the six PAQ dimensions (See Tables 10 to 14).

The independent variables above, selected by multiple regression, as well as the psychological states, were then used in the prediction of personal outcome variables (See Tables 15 to 20). The variables used in the prediction of the work outcomes (work performance and attendance) included all of the independent variables named in the personal outcome regressions. Personal outcome variables were also potential independent variables, as it is suggested that the model is four-tiered, in that the job characteristics lead to the psychological states, the psychological states in turn lead to the affective responses (general satisfaction, growth satisfaction and internal work motivation) which in turn combine to predict the behavioural outcome variables (attendance and work performance). Variables had to have a significant F ratio in the *presence* of all the other competing predictor variables to be considered significant predictors.

Table 10. Multiple Regression Predicting Work Meaningfulness for High, Medium and Low Need Strength Groups

High Growth Need Strength

Variables	*Beta Weights*	
Variety	.37	
Task Identity	.15	
Task Significance	.25	
Job Choice GNS	.19	$R^2 = .35$

Medium Growth Need Strength

Variables	*Beta Weights*	
Variety	.35	
Task Identity	.21	
Job Feedback	.16	
Social Satisfaction	.22	$R^2 = .42$

Low Growth Need Strength

Variables	*Beta Weights*	
Task Significance	.44	
Job Choice GNS	.18	
Psychology Major	-.23	$R^2 = .25$

Table 11. Multiple Regression Predicting Work Responsibility for High, Medium and Low Need Strength Groups

High Growth Need Strength

Variables	*Beta Weights*	
Job Feedback	.34	
Task Significance	.26	$R^2 = .23$

Medium Growth Need Strength

Variables	*Beta Weights*	
Task Identity	-.21	
Job Feedback	.36	
Job Context	.28	$R^2 = .20$

Low Growth Need Strength

Variables	*Beta Weights*	
Autonomy	.28	
Job Choice GNS	.25	
Age	.19	$R^2 = .18$

Table 12. Multiple Regression Predicting Knowledge of Results for High, Medium and Low Need Strength Groups

High Growth Need Strength

Variables	*Beta Weights*	
Job Feedback	.52	
Information Input	-.24	$R^2 = .30$

Medium Growth Need Strength

Variables	*Beta Weights*	
Job Feedback	.45	
Feedback from Agents	.22	
Supervisory Satisfaction	.28	$R^2 = .50$

Low Growth Need Strength

Variables	*Beta Weights*	
Task Significance	-.16	
Job Feedback	.57	
Job Choice GNS	.18	
Supervisory Satisfaction	.38	
Physical Working Conditions	-.18	
Sex	-.15	
Psychology Major	.21	
Other Job Characteristics	-.15	R = .48

Table 13. Multiple Regression Predicting Perceived Challenge for High, Medium and Low Need Strength Groups

High Growth Need Strength

Variables	*Beta Weights*	
Variety	.50	
Motivating Potential Score	.32	$R^2 = .54$

Medium Growth Need Strength

Variables	*Beta Weights*	
Variety	.45	
Task Identity	.19	
Social Satisfaction	.26	$R^2 = .45$

Low Growth Need Strength

Variables	*Beta Weights*	
Variety	.47	
Task Significance	.17	
Autonomy	.16	
Sex	.16	$R^2 = .45$

Table 14. Multiple Regression Predicting Role Clarity for High, Medium and Low Need Strength Groups

High Growth Need Strength

Variables	*Beta Weights*	
Motivating Potential Score	.28	
Supervisory Satisfaction	.24	$R^2 = .18$

Medium Growth Need Strength

Variables	*Beta Weights*	
Supervisory Satisfaction	.49	$R^2 = .23$

Low Growth Need Strength

Variables	*Beta Weights*	
Task Identity	.26	
Autonomy	-.25	
Supervisory Satisfaction	.24	
Physical Working Conditions	.22	
Mental Processes	.18	
Relationships with Others	-.24	
Feedback from Agents	-.23	
Motivating Potential Score	.42	$R^2 = .42$

Table 15. Multiple Regression Predicting Internal Work Motivation for High, Medium and Low Need Strength Groups.

High Growth Need Strength

Variables	*Beta Weights*	
Challenge	.28	
Task Significance	.30	
Job Context	.22	$R^2 = .32$

Medium Growth Need Strength

Variables	*Beta Weights*	
Social Satisfaction	.22	
Work Responsibility	.24	
Challenge	.24	$R^2 = .28$

Low Growth Need Strength

Variables	*Beta Weights*	
Variety	.18	
Task Significance	.22	
Dealing with Others	.28	
Sex	.18	
Full-time Job	-.34	
Other Job Characteristics	.26	
Work Responsibility	.18	
Role Clarity	.19	
Knowledge of Results	-.24	$R^2 = .48$

Table 16. Multiple Regression Predicting General Satisfaction for High, Medium and Low Need Strength.

High Growth Need Strength

Variables	*Beta Weights*	
Role Clarity	.19	
Supervisory Satisfaction	.20	
Age	-.24	
Work Meaningfulness	.37	$R^2 = .35$

Medium Growth Need Strength

Variables	*Beta Weights*	
Work Meaningfulness	.61	$R^2 = .38$

Low Growth Need Strength

Variables	*Beta Weights*	
Age	-.23	
Work Meaningfulness	.43	$R^2 = .24$

Table 17. Multiple Regression Predicting Growth Satisfaction for High, Medium and Low Need Strength Groups.

High Growth Satisfaction

Variables	*Beta Weights*	
Challenge	.38	
Work Meaningfulness	.23	
Social Satisfaction	.17	
Motivating Potential Score	.22	
Mental Processes	-.15	$R^2 = .57$

Medium Growth Need Strength

Variables	*Beta Weights*	
Work Meaningfulness	.27	
Supervisory Satisfaction	.18	
Challenge	.45	$R^2 = .54$

Low Growth Need Strength

Variables	*Beta Weights*	
Social Satisfaction	.49	
Full-time Job	-.17	
Work Meaningfulness	.27	
Challenge	.32	$R^2 = .61$

Table 18. Multiple Regression Predicting Performance for High, Medium and Low GNS Groups, excluding Attendance.

When Attendance was not included in the regression equations no significant predictors were found for high and low need strength groups. The tables below show the predictors of Performance for medium need strength subjects excluding Attendance, this is followed by regressions which include Attendance for all three need strength groups.

See Figure 4 for the revised Job Characteristics Model.

Medium Growth Need Strength

Variables	*Beta Weights*	
Dealing with Others	-.29	
General Satisfaction	.31	$R^2 = .13$

Table 19. Multiple Regression Predicting Performance for High, Medium and Low GNS Groups, including Attendance

High Growth Need Strength

Variables	*Beta Weights*	
Attendance	.27	$R^2 = .07$

Medium Growth Need Strength

Variables	*Beta Weights*	
Attendance	.47	
Years Spent at University	.15	
Dealing with Others	-.31	
Job Choice GNS	.23	
General Satisfaction	.20	$R^2 = .36$

Low Growth Need Strength

Variables	*Beta Weights*	
Work Meaningfulness	-.21	
Attendance	.36	
Knowledge of Results	.25	$R^2 = .17$

Table 20. Multiple Regression Predicting Attendance for High, Medium and Low GNS Groups.

High Growth Need Strength

Variables	*Beta Weights*	
Motivating Potential Score	-.43	
Dealing with Others	-.18	
Social Satisfaction	.36	
Relationships with Others	.39	
Information Input	1.15	
Psychology Major	-.12	
Work Output	.62	
Mental Processes	-.52	$R^2 = .44$

Medium Growth Need Strength

Variables	*Beta Weights*	
General Satisfaction	.27	
Years Spent at University	-.21	$R^2 = .10$

Low Growth Need Strength

Variables	*Beta Weights*	
Task Identity	-.19	
Physical Working Conditions	.58	
Job Context	-.37	
General Satisfaction	.27	$R^2 = .21$

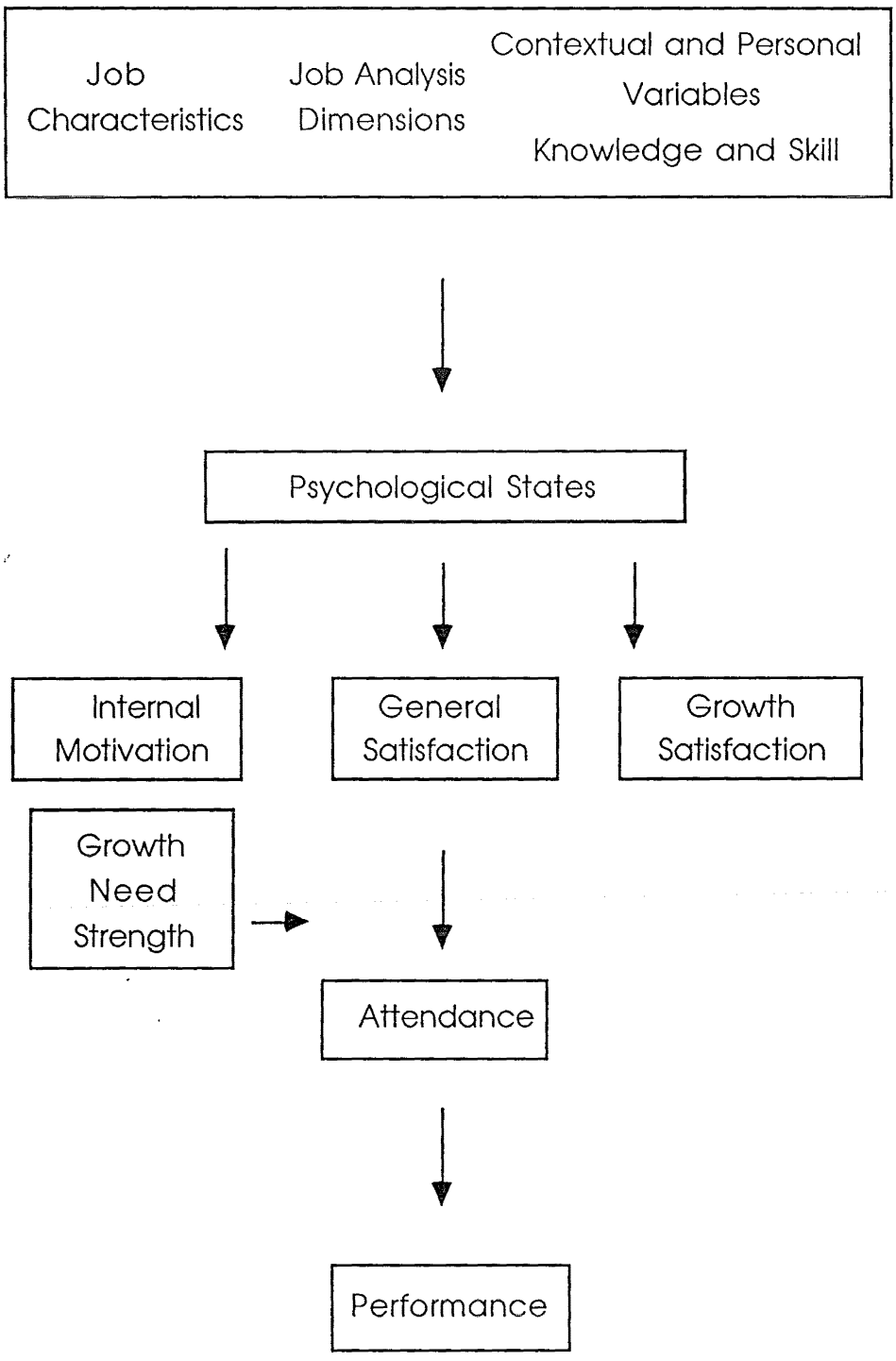


Figure 4. The Revised Job Characteristics Model

Several interpretations of the regressions were assessed. The first reported below, tested the hypothesis that the model is more efficacious for high GNS subjects. Relationships between the job analysis (PAQ) dimensions and the job characteristic variables were assessed in sub-section two. The predictor effects of contextual and personal variables were reported in sub-section three. And finally, in sub-section four, an assessment was made of the revised Job Characteristics Model.

a) GNS Levels

Hackman and Oldham (1975) predicted that high GNS subjects would respond more positively to a job with high motivating potential than would people with low need strength. This was interpreted in the present research that the model could account for a greater proportion of explained variance in the psychological states and outcomes for people with high GNS than it would for subjects with low GNS. The "would like" GNS format was utilised to score the subjects' need strength, and to trichotomise the subject pool into three GNS levels : high, medium and low GNS.

Results provided mixed support for the Hackman and Oldham (1975) hypothesis. A greater proportion of variance was explained for the high need strength group for the variables work responsibility and challenge. The greatest proportion of variance is accounted for the medium GNS group for work meaningfulness and knowledge of results, although for both variables the R^2 value was higher for the high need strength group than the low GNS group. The greatest percentage of variance accounted for role clarity was by the low GNS group.

The outcome variables, attendance and general satisfaction, provided support for Hackman and Oldham's (1975) hypothesis that more variance was explained for high than low GNS groups. However, the greatest proportion of variance of general satisfaction accounted for was in the medium GNS group. A smaller percentage of explained variance was found in high compared with low GNS groups for growth satisfaction, internal motivation and work performance. A substantially greater proportion of variance was explained for the medium GNS groups' work performance.

In summary, Hackman and Oldham's (1975) hypothesis that more variance can

be accounted for by the job characteristic dimensions for high than low GNS groups was supported in the prediction of the psychological states, with the exception of role clarity. No direct hypothesis was made by Hackman and Oldham (1975) concerning the relationship between middle need strength and high and low GNS groups. Therefore in the absence of an explicit relationship between medium and high and low GNS levels, the hypothesis that more variance is explained for high than low GNS groups is supported by the psychological states, work responsibility and challenge, and also by work meaningfulness, and knowledge of results.

The hypothesis was supported for attendance and general satisfaction but not for the remaining outcome variables for this sample. It appears that for this sample, the hypothesis holds true for work responsibility and challenge, but not overall for the outcome variables. (See Table 21 for a summary of the results). Overall, more variance was explained by the medium need strength group than by the high or low groups for work meaningfulness, knowledge of results, general satisfaction and work performance. This finding suggests that a curvilinear relationship exists for these variables over the three need strength levels.

The efficacy of GNS as a predictor variable is similar to the finding reported above. GNS was selected as a predictor variable for the original three psychological states, high and low GNS work meaningfulness, low GNS work responsibility and low GNS knowledge of results. No predictive effect was found for the additional psychological states, challenge and role clarity. Nor was an effect found for either the personal outcome variables, or attendance. GNS was a predictor of medium GNS performance.

Table 21. A Summary of the R^2 Values for High, Medium and Low GNS Levels in the Prediction of Psychological States and Outcome Variables.

	Growth Need Strength Levels					
Variables	*H>L*	*H>M*	*M>L*	*M>H*	*L>M*	*L>H*
Psychological States						
Work Meaningfulness	O			O		
Work Responsibility	X					
Knowledge of Results	O			O		
Challenge	X					
Role Clarity	O					O
Outcome Variables						
Work Motivation	O					O
General Satisfaction	O			O		
Growth Satisfaction	O					O
Work Performance	O		X			
Attendance	X					

(*H*) High GNS; (*M*) Medium GNS; (*L*) Low GNS. 'X' indicates support for Hackman and Oldham's (1975) hypothesis; 'O' indicates no support for the hypothesis.

b) Contextual and Personal Variables and Knowledge and Skill as Predictors

Contextual variables such as social and supervisory satisfaction and physical working conditions and personal variables such as sex and age were included in the list of independent variables in the regression statements in the prediction of psychological states and outcomes. Each of the measures assessing knowledge and skill : years spent at university, full-time job and psychology major, were also independent variables.

i) PSYCHOLOGICAL STATES (See Tables 10 to 14). The contextual variables were relatively effective in the prediction of the psychological states. Supervisory

satisfaction was a significant predictor of medium and low GNS knowledge of results and all three GNS levels of role clarity. Social satisfaction contributed to the explained variance of medium GNS challenge and work meaningfulness. Physical working conditions was a significant predictor of low GNS knowledge of results and role clarity.

Personal variables were relatively ineffective in the prediction of psychological states. Sex was a significant predictor of low GNS challenge, and low GNS knowledge of results. Age was a significant predictor of low GNS work responsibility.

The efficacy of knowledge and skill in the prediction of psychological states was not high. Majoring in psychology was a significant predictor of low GNS work meaningfulness and knowledge of results. Number of years spent at university and full-time job did not significantly contribute to any of the psychological states.

ii) OUTCOME VARIABLES Context variables were relatively efficacious in the prediction of outcome variables. (See Tables 15 to 20). Supervisory satisfaction contributed to the prediction of high GNS general satisfaction and medium GNS growth satisfaction. Social satisfaction was a significant predictor of high GNS attendance, high and low GNS growth satisfaction and medium GNS internal work motivation. Physical working conditions predicted low GNS attendance.

The personal variables in turn contributed to the prediction of the outcomes. Age was a significant predictor of high and low GNS general satisfaction. Sex was a significant predictor of low GNS internal work motivation. Knowledge and skill was relatively effective in the prediction of the outcome variables. Psychology major was a significant predictor of high GNS attendance. Number of years spent at university was a significant predictor of medium GNS performance and attendance. Full-time job contributed to the prediction of low GNS internal work motivation and growth satisfaction.

In summary, the context variables were effective in the prediction of psychological states and personal and work outcomes. The additional variable, physical working conditions, was found to be a significant predictor, particularly for the

psychological states, and has justified its inclusion into the Job Characteristic Model. Subject age and sex contributed to the prediction of variables at both levels of the model, as did the number of years spent at university and full-time job.

The personal variables were more effective in the predictions of psychological states for low GNS groups. The contextual variables contributed to the prediction of the psychological states for medium and low groups. The contextual variables predicted the outcome variables for all three levels of need strength. Knowledge and skill contributed to the explained variance over all three levels of the outcome variables. The personal variables were significant predictors for all three GNS levels of the outcomes, but more so for the low GNS group.

c) Objective Characteristics

The PAQ dimensions were utilised as independent variables in the regression statements for all of the psychological states and outcomes.

i) PSYCHOLOGICAL STATES (See Tables 10 to 14). The job analysis dimensions were relatively ineffective in the prediction of psychological states. Job context was a significant predictor of medium GNS work responsibility and mental processes and relationships with other persons significantly contributed to the explained variance of low GNS role clarity.

Other predictors of psychological states included : information input with high GNS knowledge of results and other job characteristics with low GNS knowledge of results. Work output was not a significant predictor in any of the psychological states. The objective dimensions did not contribute in the prediction of work meaningfulness or challenge.

ii) OUTCOME VARIABLES Mental processes was relatively effective in the prediction of personal and work outcomes. Mental processes was a significant predictor for high GNS attendance and growth satisfaction.

Job context contributed to the explained variance for high GNS internal work motivation and to low GNS attendance. Work output was a significant predictor of high GNS attendance. Information input contributed to high GNS attendance, other job characteristics contributed to low GNS internal motivation. Relationships with others predicted high GNS attendance. The job analysis dimensions did not contribute to the explained variance of work performance or general satisfaction for any of the GNS levels.

In summary, the job analysis dimensions of mental processes and job context provided a useful contribution to the explained variance of the outcome variables. The PAQ characteristics were selected as predictors of the outcome variables, and in particular attendance and work motivation, more than they were for the psychological states. The objective dimensions contributed more to the explained variance of high rather than medium or low need strength levels for both the psychological states and outcomes.

d) An Assessment of the Revised Job Characteristics Model

The model that was tested in this research can be seen in Figure 4.

i) ROLE CLARITY and CHALLENGE The efficacy of the additional hypothesised psychological states, perceived challenge and role clarity was assessed on the basis of explained variance in the prediction of outcome variables. (See Tables 15 to 20).

OUTCOME VARIABLES Perceived challenge was a significant predictor in all three GNS levels of growth satisfaction and high and medium GNS work motivation. Role clarity was a significant predictor for high GNS general satisfaction and for low GNS internal work motivation.

In summary, both role clarity and challenge contributed to the explained variance of personal but not work outcomes. These two variables significantly increased the proportion of variance explained in the Job Characteristics Model, and

as such are important additions to the model.

ii) INTERMEDIARY SATISFACTION MEASURES General satisfaction was found to be a significant predictor for medium and low GNS for attendance and medium GNS performance. Neither growth satisfaction nor work motivation contributed significantly to either of the work outcomes. The a posteriori model can be seen in Figure 4.

iii) REINSTATEMENT OF ATTENDANCE IN THE MODEL Attendance, the opposite of absenteeism, was reinstated as an outcome variable in accordance with Turner and Lawrence's (1965) original findings. As noted above, the objective measures were more influential in the prediction of attendance than for any other variable. This is particularly true for subjects with high GNS.

No variables were found to significantly predict high or low GNS performance, although attendance was utilised as an independent variable in the prediction of performance. Attendance was a significant predictor of all three GNS levels of work performance.

iv) MODERATOR VARIABLES The author does not suggest that the function of the contextual and personal variables and knowledge and skill is to be substituted in the model by a predictive rather than a moderator role. The function of the variables was changed for pragmatic rather than theoretical reasons. The variables did, however, function adequately as predictors.

v) ADDITIONAL VARIABLES The variables, dealing with others and feedback from agents have an unspecified function in the Job Characteristics Model. The present findings demonstrate the dealing with others, in particular, paid a significant contribution to vital outcomes in the model. Dealing with others was a significant predictor of work performance, attendance and internal work motivation. Feedback from agents had a lesser, but still significant, impact in the prediction of knowledge of results and role clarity.

The summary score of the five job characteristics, the motivating potential score,

contributed to the prediction of challenge, role clarity, growth satisfaction and attendance. For the main part, MPS was a predictor for the high need strength group.

In summary, the author suggests that in light of the high efficacy of these additional variables in the prediction of both psychological states and outcome variables, a more formal role in the Job Characteristics Model is called for.

Chapter Six

DISCUSSION

There were five research domains in this study. The areas are presented in the following order : the dimensionality of the five job characteristics was assessed. These variables form the foundation of the Job Characteristics Model and as such are vital to research in job redesign. The functions of need strength were examined. Growth need strength was hypothesised by Hackman and Oldham (1975) to perform a moderating function between the job characteristics and psychological states, and between the psychological states and outcome variables, and was used additionally to define the population to whom the model applied. Need strength was also assessed as a predictor variable. The predictive utility of contextual and personal variables and knowledge and skill was assessed. The relationship between subjective perceptual indices (using the JDS and the JRF) and the more objective job analyses (using the PAQ) was examined. The several modifications made to the Job Characteristics Model were assessed.

Each of these areas is discussed in detail below. This chapter concludes with suggestions for future research and changes to the model.

1. DIMENSIONALITY OF THE JOB CHARACTERISTICS

The dimensionality of the JDS was assessed, as recommended by Dunham et al. (1977) and Green et al. (1979), who had suggested that differential factor structures are produced by idiosyncratic characteristics of each sample. It was proposed that the sample utilised in the present research was similar in some demographic

characteristics (that is, age and education) to the young, highly educated people in Fried and Ferris' (1986) research. The results of the factor analysis closely resembled those obtained by Fried and Ferris.

A good fit of the a priori dimensionality of the job dimensions was made using confirmatory factor analysis (Harvey et al., 1985). Task identity, job feedback and autonomy items loaded on their appropriate factors. Some slight variation was found for task significance and skill variety, with item three of task significance loaded on autonomy, skill variety and task significance factors. This finding was similar to that of Fried and Ferris (1986) for their entire sample, where one factor was identified by the collapse of task significance, skill variety and autonomy. However, in the present finding only one task significance item loaded onto deviant factors.

The second variation to the a priori structure concerned a priori item one of the dimension variety which loaded on the feedback and autonomy dimensions. Several other reports of slippage between autonomy and variety have been documented (Dunham et al., 1977; Fried and Ferris, 1986; Green et al., 1979; Pierce et al., 1986; Schnake and Dumler, 1985).

It was suggested that negatively scored items were a reason for the inconsistency in studies which tested the dimensionality of the job characteristics (Harvey et al., 1985; Idaszak and Drasgow, 1987). The present finding provides partial support for this explanation. The loading of item 2 of the dimension autonomy and item 3 of task significance, which are both negatively scored items, were not in accordance with the a priori factor structure. However, the negatively scored items for the other job characteristics loaded onto the a priori factors. An exception was the positively scored item 1 of variety which did not fullfil its a priori loading.

No support was found for the proposition that differential question structure was accountable for lack of support for the a priori factor structure (Graen et al., 1979; Harvey et al., 1985).

The dimensionality of the core job characteristics is fundamental to the model. Hackman and Oldham (1975) hypothesised that *five* characteristics influenced a

worker's psychological perceptions and work outcomes. Results from the present study produced a good approximation to the a priori five-factor structure of the Job Characteristics Model.

2. THE FUNCTIONING OF GNS

Growth need strength was hypothesised to have two functions in the Job Characteristics Model. The first function was to act as a moderator between the job characteristics, psychological states and outcome variables. The second function was to define the population to whom the model applies. Hackman and Oldham (1975) hypothesised that people with high growth needs will respond more positively to a job with high motivating potential than will people with low need strength. As well as the previously mentioned uses, a third function of need strength, that of a predictor of psychological states and outcome variables, was assessed in this research. It is suggested in this study that the effect of need strength may not be a moderating one, but a predictive one.

a) Moderator Effects

The statistical techniques implemented to test moderator effects in this study differed from the majority of those previously used. Most earlier studies used a correlational approach whereby the efficacy of GNS was assessed by comparing the correlations of job characteristics with psychological states and outcomes for the top and bottom thirds or quartiles of the sample on GNS levels (for example, Hackman and Oldham, 1975; Oldham et al., 1976; Loher et al., 1985; Spector, 1985; Umstot et al., 1976). This approach assessed only the hypothesis (Hackman and Oldham, 1975) that high GNS workers should respond more positively than low GNS workers. No complete assessment of the moderating function of GNS was made.

Need strength is hypothesised to perform a moderating function at two levels of the model, between job characteristics and psychological states, and between the psychological states and outcome variables. The moderating effect of GNS between job characteristics, psychological states and outcomes was assessed by this

researcher using hierarchical regression (Arnold and House, 1980; Zedeck, 1971). No moderating effect was found for GNS between job characteristics and the psychological states. This finding was not in keeping with past research. Arnold and House (1980) reported some support for the moderating effect of GNS between job characteristics and psychological states. The present research found no moderating effects between the psychological states and the personal outcome variables or for work performance. This result, while not in support of the model, was comparable with previous findings (Arnold and House, 1980; Farh and Scott, 1983; Hogan and Martell, 1987; Kemp and Cook, 1983; Oldham et al., 1976; Orpen, 1979; Spector, 1985; Umstot et al., 1976). Need strength moderated the relationship between the psychological states and attendance in the present study, unlike previous findings (Hackman and Lawler, 1971; Hackman and Oldham, 1976; Orpen, 1979; Spector, 1985).

Results from the present study may have differed from those of Arnold and House (1980) for several reasons. The author suggests that the sample in the present study and the type of work that was assessed, namely university students who rated their course work, may have influenced the lack of support for a moderating effect by GNS, whereas Arnold and House (1980) had utilised a sample from an engineering division of a medium-sized manufacturing organisation. Alternatively, the regression procedure itself may have contributed towards the discrepancy in findings. The regressions utilised by Arnold and House (1980) were based purely on the Job Characteristics Model, in that the psychological states and only the psychological states were regressed onto the outcome variables and each job characteristic was regressed onto the psychological state on which it had been hypothesised to act (Hackman and Oldham, 1975). The present study utilised all of the independent variables in the hierarchical regressions testing the moderator effects of need strength.

b) GNS Levels

Subjects with high need strength were hypothesised to respond more positively than people with low need strength to jobs with high motivating potential. A wealth of data has been neglected in past research which has compared only high with low need strength subjects. The present study redressed this problem by utilising separate

regression equations for high, medium and low GNS subjects. The "would like" GNS format was used to separate the subject pool into three groups. The author suggests that it is intuitive to hypothesise that more variance will be accounted for for high than medium need strength subjects, and more variance explained for medium than low need strength people.

Results indicated support for the hypothesis that more variance could be explained by the model for subjects with high need strength than for people with low need strength for the psychological states. The exceptions included knowledge of results and role clarity, where the greatest proportion of variance was explained for medium and low GNS subjects respectively. A larger proportion of variance was explained for the subjects with medium need strength than for those with either high or low need strength for work meaningfulness.

More variance was explained for high than low need strength subjects for the outcome variables attendance and general satisfaction. However, a greater proportion of variance was accounted for general satisfaction for medium GNS subjects. Findings were not supportive of the hypothesis for work performance, growth satisfaction and work motivation.

In summary, the Hackman and Oldham (1975) hypothesis that more variance can be accounted for by the job characteristic dimensions for high than medium and low GNS groups was supported in the prediction of work responsibility and challenge. It was also found that people with medium GNS responded more positively than those with low need strength for work performance. There is an advantage in using separate regressions for each of the need strength levels in that an increased amount of variance is explained for some groups. For example, for the total sample (see Table 9, Level 1) the explained variance for work performance was 15%. When the sample was categorised by GNS, the explained variance ranged from 7% to 36% for the three need strength levels. Although the percentages were not totally supportive of the hypothesis (Hackman and Oldham, 1976), this procedure has the advantage of increasing the explanation of some variance for some groups.

The lack of support for the hypothesis may be accounted for by the motivating

potential score. Hackman and Oldham (1975) hypothesised that individuals with high growth needs will respond more positively to a job with *high motivating potential* than people with low growth needs. Few studies have discussed the MPS in terms of magnitude. No deliniation has been made to identify what constitutes a *high* motivating potential score. The mean MPS for the present sample was 89.5. Previous scores have ranged from 76.5 (Oldham et al., 1976) to 132.0 (Arnold and House, 1980; author's computation).

The author suggests that it is possible more substantial differences were not found between high and low GNS groups in the prediction of outcome variables because of the relatively low motivating scores among subjects in the high group. It is apparent from the results of the present study that the exclusion of the medium level GNS subjects in the past has been at the expense of the general applicability of the model.

It is suggested that the interpretation of the hypothesis that people with high need strength will respond to a job with high motivating potential more positively than people with low need strength may not necessarily have beeen optimally operationalised as it was in the present research. Equating the above hypothesis with a level of explained variance may not be an ideal or optimal approach to testing the hypothesis. More research is needed in this area.

c) Need Strength as a Predictor Variable

GNS was selected as a significant predictor of the three original psychological states and of work performance. The effects covered all three need strength levels. The predictive relationships indicated that subjects with high need strength perceived their work to be more meaningful and more responsible than subjects with lower need strength. High GNS subjects also perceived a higher awareness of their work performance than other subjects. The prediction of work performance was particularly interesting. More variance was explained for the performance levels for subjects with medium need strength than for subjects with either high or low GNS. No explanation is immediately available for this finding. The present results indicate that the exclusion by the Job Characteristics Model of the medium need strength worker must be questioned and possibly revised.

Overall growth need strength provided a useful contribution to the model although not in the specified manner. Need strength functioned both as a predictor and as a method to increase explained variance for subject groups. Attendance was the only variable that was moderated by need strength.

3. CONTEXTUAL AND PERSONAL VARIABLES AND KNOWLEDGE AND SKILL AS PREDICTORS

The Job Characteristics Model was revised to take into account the employee's perception of the work situation in 1980 by Hackman and Oldham. It was suggested that social, supervisory, pay and security satisfactions influenced or moderated the employee's psychological states and affective and behavioural responses to the job. Tests of this hypothesis in the literature were made again using a correlational approach (for example, Oldham et al., 1976; Orpen, 1979). As discussed earlier, this approach cannot assess any causal influence that variables may have, and therefore was not utilised in the present research. Personal and contextual variables and knowledge and skill were tested as predictors, rather than as moderators, in the current study. Measures of context satisfactions employed in this model were social or co-worker satisfactions, supervisory satisfactions and an assessment of physical working conditions. These measures were incorporated as independent variables in the prediction of psychological states and outcomes.

Direct comparison of the present results with those of Oldham et al.'s (1976) are not possible as the context variables were not utilised as predictor variables in the earlier study. Oldham et al. (1976) reported that there was a moderator effect between salary and social satisfaction, salary and work motivation, and social satisfaction and performance. The present study did not include pay and security satisfaction measures as it was not appropriate to the university setting. No support was found in the present study for the relationship between social satisfaction and performance. Predictor effects by the context variables in the present research were marginally stronger between the job characteristics and psychological states than between the psychological states and outcomes.

As previous research findings suggested (Oldham, 1976), subjects who were satisfied with their co-workers were highly motivated and were satisfied with the growth opportunities available to them. The present study found that satisfied subjects had higher attendance levels than subjects who were less satisfied, unlike previous findings (Steers and Rhodes, 1978). Satisfied people saw their work as more meaningful and challenging than those who were dissatisfied with their co-workers.

Satisfaction with supervisors resulted in subjects perceiving a high level of awareness of the results from their work performance and high perceived role clarity. Satisfied subjects were generally more satisfied with their work and with opportunities for growth in the work place. This supports past research findings (Inkson, 1977) which indicated that good relations with supervisors were related with high job satisfaction. As past research has found (Griffin, 1983), there was no relationship between supervisory satisfaction and performance in the current study.

Physical working conditions had a negative impact on knowledge of results. Subjects who were satisfied with their physical working conditions perceived their work to have high role clarity and these subjects had higher attendance levels than people who were not satisfied with their working conditions.

Overall, high context satisfactions resulted in subjects being more motivated, more satisfied with opportunities for growth in the workplace, and having high attendance levels. The present study mirrors the positive relationship between job satisfaction and attendance which is documented in the literature (Clegg, 1983; Porter and Steers, 1973; Staw, 1984; Steers and Rhodes,1978). A good understanding of the job, in terms of role clarity and knowledge of results, resulted from satisifaction with the work content. The effects of the context variables, then, were highly beneficial to the employee's understanding of the workplace.

Unlike the findings of Loher et al. (1985), contextual factors were shown to have influenced all three need strength levels of the sample. This finding indicates that supervisory and co-worker satisfaction and physical working conditions influenced the entire sample. Generalising this finding to the work place, satisfaction with the three variables is indicated to affect the general satisfaction, satisfaction for growth

opportunities and attendance levels of all workers, regardless of need strength levels.

Personal attributes were also found to be significant in the prediction of dependent variables in the model. The results of the present research supported the findings that there were idiosyncratic differences (Dunham et al., 1977; Fried and Ferris, 1986; Green et al., 1979) in the manner in which subjects perceived job characteristics, with regard to age, education and position level in the organisation. Older subjects saw that the work had a higher level of responsibility than younger subjects, and were also generally less satisfied with their work.

Previous evidence strongly suggested that general work satisfaction increases with age (Oldham et al., 1976; Rhodes, 1983), unlike the present findings. The age distribution of the sample is comparatively narrow, ninety percent of the subjects were twenty-five years or younger. "Older" workers in the present study were younger than "older" people in past research. This may account for the finding that older workers were less satisfied than younger people. Alternatively, the reason for this discrepancy with past findings may, in part, be due to the type of work being evaluated. Older people are more likely to have begun or have returned to university after having participated in the workforce and/or performed the role of a homemaker. The author suggests that these subjects may be experiencing problems with organisational entry (Wanous, 1976).

Males had greater perceived knowledge of results than females. Female subjects perceived the work to be more challenging and were more motivated than males. The present finding of differences in psychological states may be due to greater confidence levels of males and fear of failure of females in adolescense. No sex differences were found for work performance and this was in keeping with past findings (Walker and Fennel, 1986).

Subjects who had spent more than one year at university had higher work performance levels than first year students. The number of years spent at university was the only knowledge and skill variable that predicted performance. This indicates that subjects who have had experience in the university system attain higher performance scores than students who were new to the university. Similarly, one could generalise to

the work force, where experienced workers have higher performance levels than inexperienced workers (Giniger, Dispenzieri and Eisenberg, 1983).

First year students had higher attendance levels in the present study than those of more advanced subjects, although in the present research no age differences were found for attendance. Subjects who had had no previous work experience were more motivated and were more satisfied with opportunities for growth in the work place. This finding may tie in with the previously mentioned result that older people being less satisfied with their work. As suggested above, these people are more likely to have participated in the workforce, and may be experiencing problems with organisational entry (Wanous, 1976), and this may be expressed in terms of dissatisfaction with opportunities for growth in the work and lack of internal work motivation.

Subjects who were *not* majoring in psychology were more aware of the results from their work performance. Comparatively, those who were majoring in psychology perceived the work as more meaningful than those who were not majoring in psychology. Subjects who were majoring in psychology may be said to have a higher degree of involvement or commitment with the course compared with people who did not intend to major in the subject. This is reflected in the higher attendance levels for subjects who stated they planned to major in psychology than for people who intended to major in other subjects or were undecided. The author suggests that involvement or commitment may account for the higher level of meaningfulness perceived by the commited group. However, commitment may confuse the degree of awareness of performance results for the commited group. That is, as the valence of a course increases, so does the fear of failure. The author suggests that this fear of failure may account for the lesser awareness of knowledge of results by the commited group who intended to major in psychology.

In summary, the context variables acted as predictors for the psychological states and to a lesser extent, for the personal and work outcomes. The additional variable, physical working conditions, was found to be a significant predictor, particularly for the psychological states, and has justified its inclusion into the Job Characteristics Model. Subject age and sex functioned as predictors at both psychological states and outcome levels of the model. Knowledge and skill, which has

largely been neglected in the empirical literature, has provided a useful contribution to the explanation of the outcome variables.

4. OBJECTIVE CHARACTERISTICS

Many criticisms have been made regarding the empirical approaches to the study of job characteristics and job outcomes. The reliance by researchers on self-report data using the Job Characteristics Model is a major criticism (Roberts and Glick, 1981). A second criticism is the tendency to gather measures of the task characteristics (independent variables) and job attitudes (dependent variables) using one instrument, usually the JDS (Algera, 1983; Roberts and Glick, 1981).

The present study does not fall prey to these censures. The data are not purely self-report, as they have been supplemented by supervisors' ratings based on their observations. Nor does this research rely totally on one instrument. The JDS is self-rated, certainly. However, supervisors use both the JRF and the PAQ to rate the work of the students.

Exploration of the relationships between objective and subjective assessments are discussed below.

a) JDS - JRF

Unlike previous studies which correlated self and supervisor-rated job characteristic variables (Birnbaum, Farh and Wong, 1986; Hackman and Lawler, 1971; Oldham, Hackman and Pierce, 1976) this research identified *no* significant correlations between the two assessments of the same variable. Previous studies have, however, documented insignificant correlations for the characteristics feedback (Birnbaum et al., 1986; Hackman and Lawler, 1971) and task significance (Birnbaum et al., 1986). The present findings may reflect comments made by Birnbaum et al. (1986), who suggested that supervisors were better able to distinguish between job characteristics than were subordinates.

The mean responses in the present research for the JDS and the JRF on each of the dimensions are similar, with task identity showing the greatest deviancy between the two rating methods. Similarities in the mean ratings indicate that insignificant correlations may be due to sample size differences in the rating forms, as opposed to vastly different perceptions of job dimensions.

b) JDS - PAQ

Relationships between the job characteristics and the PAQ dimensions were few and small in this study. The PAQ measure which demonstrated the greatest overall relationship with the job characteristic dimensions was job context. Job context is defined in the PAQ in terms of the physical and social settings within which the work is performed. Small but significant correlations were found between job context and each of the job characteristics with the exception of autonomy. Job context correlated with each of the psychological states and the personal outcome variables. These correlations suggest the presence of an underlying relationship between the more objective variable with the subjects' perceptions of their work. Further research is necessary to investigate that relationship. However, it appears from the present findings, that the social and contextual work setting influences the subjects' perceptions of their work.

The low relationships between the JDS and PAQ variables in this study deviate from previous findings. Dunham (1977) reported coefficients ranging from .21 to .49 for correlations between job complexity (a composite of variety, autonomy, task identity, task significance and job feedback) and PAQ dimensions.

A possible explanation for the apparent discrepancy is that in this study the JDS was self-rated and the PAQ was supervisor-rated. Whereas in Dunham's (1977) study both the JDS and the PAQ were rated by the job incumbents.

c) JRF - PAQ

No significant correlations between the JRF and PAQ dimensions have been reported in the literature. However, in the present research several significant

correlations were found between the supervisor-rated job characteristic and job analytic variables. The correlation coefficients between the JRF and the PAQ dimensions were more numerous than those between the JDS with the PAQ, and the JDS with the JRF, and were also greater in magnitude.

Again, a possible explanation lies in the fact that the JRF and PAQ were supervisor-rated whereas the JDS was self-rated. Although the JRF and PAQ measures are very different in orientation, it is suggested that rater consistency or possibly bias was influencing the relationships among the PAQ, JDS and JRF.

In summary, supervisor-rated job characteristics were more inter-related with the job analysis PAQ dimensions than were the self-rated job characteristics. The supervisor-rated job characteristics were more inter-related with the job analysis PAQ dimensions than they were with the self-rated job characteristics.

d) The Objective Dimensions as Independent Variables

Aldag et al. (1981) suggested that it

> "...may be useful to attempt a direct assessment of objective and/or perceived linkages among task dimensions" (p. 429).

The present research addresses this suggestion. The job analysis dimensions were included as independent variables in the prediction of psychological states and work and personal outcomes (Birnbaum et al., 1986). Little empirical research has been performed in this area.

Dunham et al. (1979) compared the variance accounted for by the PAQ and JDS for the outcome variables in the Job Characteristics Model. Eight percent of the variance was explained for internal work motivation by both the JDS and the PAQ (independently). Job context and other job characteristics contributed to the twenty-eight to forty-eight percent of the variance accounted in work motivation in the present study (the range is for high to low GNS groups). Direct comparison of percentages is misleading in that Dunham et al. (1979) performed separate equations for each of the measures. The present study indicates that combining the two

instruments in a single regression has the advantage of a greater proportion of explained variance for both the psychological states and outcome variables.

In Dunham et al.'s (1979) research, the PAQ contributed ten percent of the explained variance of the personal outcome variables. Twenty-five percent of the variance was explained by the JDS. The present study found no relationship between the PAQ and general satisfaction, although a percentage similar to those of Dunham et al.'s, twenty-four to thirty-eight percent of general satisfaction variance, was accounted for by the JDS variables. The job analysis dimension 'mental processes' contributed to growth satisfaction. The explained variance for that outcome ranged from fifty-four to sixty-one percent.

The JDS accounted for twelve percent and the PAQ thirty percent of the variation in work behaviour in Dunham et al.'s (1979) study, where work behaviour was defined as peformance level and company policy adherence. The present research revealed no relationship between the objective dimensions and work performance. The explained variance ranged from seven to thirty-six percent and this finding was comparable with that of Dunham et al.'s. However, as both the JDS and PAQ variables were included in the prediction of performance, it is suggested that had Dunham et al. used both measures, their results could well have exceeded the explained variance percentages from the present study.

Dunham et al. (1979) did not investigate the relationships between the PAQ, the JDS and attendance. However, the present finding reported a predictive relationship between mental processes, job context, work output, relationships with others and information input with attendance. A range of ten to forty-four percent of the variance for the outcome attendance was accounted for by the independent variables. This finding indicates that the full range of objective dimensions (with the exception of other job characteristics) were related with attendance for high need strength subjects. Work attendance of medium and low GNS people was influenced by general work satisfaction rather than objective characteristics. People with high needs for personal challenge, accomplishment and development were influenced by cognitive and physical activity, information sources, relationships with other persons and the physical and social settings in which they worked.

Overall, more variance was explained in the present study, than was explained by Dunham et al. (1979). As discussed above, this may be due to Dunham et al.'s strategy to focus on a comparison of variance accounted for between the JDS and the PAQ. The present study focused on increasing the explanation of the dependent variables by using both JDS and PAQ variables in the regression equations. Unlike previous research (Dunham et al., 1979), the present study found no relationship between the PAQ variables and either general satisfaction or work performance.

No previous research has investigated the relationships between psychological states and PAQ variables. The present findings indicate a relationship between knowledge of results and information input and other job characteristics. Job context was a predictor of work responsibility. Mental processes and relationships with other persons contributed to the prediction of role clarity. As relationships with others increases role clarity decreases. This finding appears to tie in with the inverse relationship between role clarity and feedback from agents. More interaction with co-workers and tutors leads to a decrease in role clarity. No relationship was found between the objective job dimensions and challenge and work meaningfulness.

Overall, the job analytic dimensions which contributed the most significant contributions to the psychological states and outcome variables were mental processes and job context. Mental processes encompasses all the various cognitive activities involved in the job, including reasoning, decision-making, planning and information processing activities. Job context relates to both the social and physical contexts in which the work is performed. These two variables contributed to both the psychological states and outcomes.

On an intuitive level, cognitive activities and a social environment would appear to typify stereotypical perceptions of students. The present research indicates that cognitive activity and contextual factors cause both the psychological states and affective reactions to the work, as well as attendance levels. This finding is comparable with Rousseau's (1982) research, where skills involving working with data and dealing with people influenced employees' work experiences. The present finding is supportive of the research of social-information processing theorists Thomas and Griffin (1983), who reported that social and informational cues have been consistently shown

to influence perceptions and affect. No contribution was made by the objective dimensions to work performance. However, the objective dimensions formed a major part in the prediction of attendance.

5. AN ASSESSMENT OF THE EFFICACY OF THE ORIGINAL MODEL

Several areas of assessment are discussed in this section. First, the predictive efficacy of the model is evaluated. Second, the consequences of redefining task identity are assessed. Third, the efficacy of the additional variables, dealing with others, feedback from agents and MPS are evaluated. Finally, the impact of need strength and the knowledge and skill variables are assessed.

a) Predictive Efficacy of the Model

An assessment of the predictive efficacy of the original Job Characteristics Model must be partially limited to the prediction of psychological states. The outcome variables are predicted by the model to result from the psychological states with a moderating influence by need strength. However, no specific relationships are identified between individual psychological states and outcome variables. On that basis, as some relationships between the psychological states and outcome variables have been identified in the present study, the Hackman and Oldham (1975, 1980) model has been supported.

The prediction of the psychological states by job dimensions has provided moderate support for the original model. Work meaningfulness was predicted by skill variety, task identity and task significance as hypothesised, and also by job feedback. Work responsibility was predicted by autonomy as hypothesised, but also by task identity, task significance and job feedback. Knowledge of results was predicted by job feedback and feedback from agents, and also by task significance. Each of the psychological states was predicted by the job characteristic(s) specified in the model and also by other job characteristics.

Work motivation was predicted by work responsibility and knowledge of results. Subjects who felt personally accountable and responsible for their performance were more motivated than those who felt less responsible. The greater the internalisation of responsibility for his or her work performance, the more that person experienced positive internal feelings when performing effectively on the job. A less intuitive result was that the greater the awareness of his or her performance, the less motivated the subject. It is suggested that the subject's performance level was not as high as he or she expected, and as a consequence the person may have become less motivated. As a general comment, to gain access to university, first year students are likely to have achieved relatively high grades at secondary school. The author suggests that the higher academic standards expected at university may account for a drop in perceived performance which may explain this finding.

General satisfaction and growth satisfaction were predicted by work meaningfulness. Subjects who saw the work as meaningful and worthwhile were more satisfied and happy with their work, and were satisfied with opportunities for personal growth and development on the job. Knowledge of results and work meaningfulness were predictors of work performance. The greater the subject's awareness of the results of his or her work performance, the better the performance. However, subjects who saw the job as less worthwhile had higher work performance than those who saw it as worthwhile. No explanation is available for this finding. None of the original psychological states were significant predictors of attendance. As noted above, no specific relationships were identified between the psychological states and outcome variables in the original Job Characteristics Model (Hackman and Oldham, 1975), and therefore comparison with previous findings was not possible.

Past research has combined the three psychological states in the prediction of the outcome variables (Arnold and House, 1980), again making direct comparisons with the present research impossible. The mediating psychological states provided a useful contribution to the explained variance, as they have in past research (Hogan and Martell, 1987).

b) Task Significance

The re-definition of task significance to encompass a more personal outcome

did not appear to have altered the function of this variable in the model.

c) Dealing with Others, Feedback from Agents, MPS

The additional dimensions, dealing with others and feedback from agents, have been described as useful variables in the understanding of the work (Hackman and Oldham 1975). These two variables have been useful in the present study. The more the job required the subject to work closely with other people, the more the subject was internally motivated. The social aspects of the work were closely related with the subject's motivation. Job context, which incorporates a social component, and co-worker satisfaction were also influential in the subject's motivation.

Although the effect of dealing with people had positive motivational aspects, the effects on both performance and attendance were negative. The more a person had to deal with other people, the lower his or her work performance and attendance. It is suggested that the greater the social activity, related to university work, the less the study time. The outcome of decreased study time is, probably, reflected in diminished performance. The relationship between attendance and dealing with other people is similar. The social aspects of university life, it is suggested, had over-ridden the requirements of attendance. Alternatively, the student may have come to rely on friends (co-workers) to take notes for him or her, instead of attending in person.

The greater the feedback from tutors and/or co-workers regarding the worker's performance, the greater the understanding of his or her performance effectiveness. However, role clarity was diminished by feedback from others. As noted above, the job analysis dimension, relationships with other persons, also had a negative effect on role clarity. It is suggested that this finding may be related to conflicting advice regarding the work requirements of the stage one course from co-workers (fellow students) and tutors.

On the basis of the significant impact dealing with others and feedback from agents have in the current research, the author recommends the two variables be included with the five original job characteristics in the model as core dimensions.

The greater the overall motivating potential of the work, the greater the

perceived challenge and role clarity and satisfaction for opportunities for growth in the work. Attendance levels were higher for those who perceived a lower MPS. It is suggested that this finding may be related to the relatively low MPS score in the present study.

d) Knowledge and Skill

Knowledge and skill was an additional moderator variable hypothesised to act between the psychological states and outcome variables (Hackman and Oldham, 1980). The author suggests that within the university context, which was employed in this current study, the number of years the person has spent at university, whether or not the person has held a permanent job and whether or not the subjects intends to major in psychology are related to the experience of university work. These measures, then, are the relevent equivalents to knowledge and skill, in this context. Knowledge and skill, suggested to be the most important moderator of how a person reacts to a job (Hackman and Suttle, 1977), was tested as a predictor variable. The efficacy of the knowledge and skill variables was high, significantly predicting work performance, work motivation and growth satisfaction. The author suggests that future researchers test the variable as it was hypothesised to function, as a moderator variable.

e) Need Strength

As discussed in earlier sections, need strength was hypothesised to moderate between the job characteristics, psychological states and outcome variables (Hackman and Oldham, 1975). Little support was found for that hypothesis in the present study. In fact, the one variable that was moderated by need strength, attendance, had been eliminated from the model (Hackman and Oldham, 1980).

Findings were also mixed for the hypothesis (Hackman and Oldham, 1975) that people with high need strength will respond more positively to a job with high motivating potential than will people with low need strength. In the present study, it was suggested that medium need strength people would respond more positively than low need strength subjects, and less positively than high need strength people. Support was found for this modified hypothesis for work responsibility and challenge. The original hypothesis was supported in the present study by work meaningfulness, work

responsibility, challenge, general satisfaction, and attendance. It is suggested that data from medium need strength subjects must be studied further.

6. ASSESSING THE REVISED JOB CHARACTERISTICS MODEL

(See Figure 4).

Several modifications were made to the Job Characteristics Model in the present research. The efficacy of those changes is appraised below.

a) Additional Psychological States

The two additional psychological states, role clarity and challenge, contributed to the explained variance of personal but not work outcomes. People who saw their work as challenging were more motivated and were more satisfied with the opportunities for growth in that work. Subjects who perceived clarity in their work roles were generally more satisfied and more highly motivated than people who saw their work as lacking in role clarity. Role clarity indirectly contributed to the prediction performance and attendance through general satisfaction.

Relationships demonstrated between the job characteristics and challenge and role clarity in previous research, differ with the present findings. Walsh et al. (1980) reported challenge to be a function of autonomy and variety. The present research reveals that for this sample, challenge is a function of variety, autonomy, identity and task significance (not included by Walsh et al., 1980). Task identity, autonomy and feedback from agents significantly contributed to the prediction of role clarity in the present study. In comparison, however, Walsh et al. (1980) reported that the feedback variables produced the only significant relationships.

The two additional psychological states, challenge and role clarity, increased the understanding of affective but not behavioural work responses.

b) Job Characteristics

The predicted relationship between job characteristics and psychological states

provided support for the original model. Each of the psychological states was related to the variables specified in the original model and also with other job characteristics. It is suggested that predicting specific relationships between individual job characteristics and psychological states is not conducive to a more general understanding of the model. No specific relationships are identified between the psychological states and outcome variables. The author recommends that the same approach is adopted between the psychological states and job characteristics.

c) Intermediary Satisfaction Measures

Affective work reactions were hypothesised to intervene between the psychological states and the work outcomes. It was suggested that subjects' behavioural responses to their jobs were influenced by their satisfaction with their jobs, in keeping with Social Information Processing Theory (Salancik and Pfeffer, 1978; Hogan and Martell, 1987; Thomas and Griffin, 1983). Findings indicated that general satisfaction influenced both attendance and work performance. No significant predictive relationship was found between internal work motivation and growth satisfaction with work performance and attendance.

The relationship between satisfaction and performance is a dense and confused area (Brayfield and Crockett, 1955; Cherrington, Reitz and Scott, 1971; Greene, 1972, 1973; Herzberg, Mausner, Peterson and Capwell, 1957; Sheridan and Slocum, 1975; Staw, 1984; Vroom, 1964; Wanous, 1974). Findings for the "satisfaction to performance" link have, for the main part, been insignificant (Greene, 1972; Porter and Lawler, 1968). This may be because performance is often measured at only one point in time (Fisher, 1980; Staw, 1984). Empirical support has been found for the alternative position that job satisfaction is dependent on work performance (Porter and Lawler, 1968; Greene, 1972). This position was not assessed in the present study.

Fisher (1980) recommended the utilisation of multiple assessment points in the study of performance, to reduce the effects of biases or mood influences on the measures. Research that has utilised this type of instrumentation (for example, Sheridan and Slocum, 1975) found some support for the position that satisfaction influenced performance for some employees under some conditions. The present study used a variety of objective measures over several time periods, and although the

measures were not repeated as Fisher (1980) recommended, high general work satisfaction was found to be a significant predictor of high work performance.

This finding may be accounted for by several reasons. The sample employed in the present research, university students, may perceive their work in a different manner from employees in an applied setting. Alternatively, cross-cultural differences may exist between New Zealanders and the predominantly American samples used in past research. No norms have been produced for a New Zealand sample. However, a comparison of means of the present sample for the job characteristics with American normative data does not indicate any substantial difference. Finally, the assessment of work performance in the current study, using a series of objective measures, differs from previous work using self or supervisor ratings of performance appraisal (for example, Arnold and House, 1980; Hackman and Lawler, 1971; Hackman and Oldham, 1976; Orpen, 1979).

Some support has been found in the literature for the influence of satisfaction on absenteeism, that is, that job dissatisfaction is related to high absenteeism (Clegg, 1983; Porter and Steers, 1973; Steers and Porter, 1979). The motivation to attend work has been found to be influenced by job satisfaction (Steers and Rhodes, 1978; Vroom, 1964).

General satisfaction was a significant predictor of attendance in the present research. This finding may be accounted for in the assessment of attendance. The opposite of absenteeism, attendance, was reinstated with the outcome variables in the model in keeping with the Turner and Lawrence (1965) findings. Measures of attendance (instead of absenteeism) lead to more stable measures over time, and the concept of attendance is more positive and helpful than absenteeism (Latham and Pursell, 1975, 1977). The efficacy of this reinstatement was based on the fit of the variable to the model. On an a posteriori basis, attendance contributed to the prediction of performance and this in itself is a worthy reason to include the variable in the model, as work performance

> "... is the contemporary incarnation of the ultimate criterion..."
>
> (Hakell, 1986 p. 355).

7. COMMENTS ON THE CURRENT RESEARCH

Several advantages were gained using the current research strategy. First, the reinstatement of attendance in this research provided support for the original model (Hackman and Oldham, 1975) and for earlier findings (Turner and Lawrence, 1965). It is suggested that recent findings which have not provided support for the attendance part of the model may be due to the instrumentation of absenteeism (Latham and Pursell, 1975, 1977). The present finding used attendance as a measure and provided support for the Job Characteristics Model.

Second, it has been suggested that researchers narrow their studies unnecessarily (Roberts and Glick, 1981). To overcome this criticism, the present study addressed several facets of the model, including assessing the efficacy of need strength as a moderating variable and as a predictor. A test was made of GNS as the definition for whom the model applies. The dimensionality of the core job characteristics was assessed, as was the relationships between more objective measures (using the PAQ) and the job characteristics, and so on.

Third, the present research found a positive causal link between satisfaction and performance. The empirical literature is generally unsupportive of this position. The author suggests that this finding may be related to the sample used and/or the multiple assessments of work performance (Fisher, 1980).

Fourth, a multi-faceted examination of the functioning of need strength was performed in the present study. An assessment was made of GNS both as a moderator and a predictor variable. The hypothesis that people with high need strength will respond more positively to a job high in motivating potential than people with medium or low GNS was tested. Criticisms have been made (Roberts and Glick, 1981) regarding the unnecessary neglect of data by researchers in the job redesign area in the practice of testing only the top and bottom thirds or quartiles of the sample. The current study did not eliminate data from any sample group.

The current research strategy had several limitations. First, the sample was a somewhat unusual occupational group in that although the students were rating work

which they performed for a university year, the work was unpaid, and unstructured when compared with a regular work sample.

Second, the moderator effects of the contextual and personal variables and knowledge and skill were not assessed.

Third, the regression procedures used in the present research had the disadvantage of making direct comparisons with past research difficult. The utilisation of both the JDS and PAQ variables in the same equations enabled increased explained variance, but had the drawback of disallowing direct comparisons with previous findings (Dunham et al., 1979). In addition, although the use of regressions to assess the hypothesis that high need strength subjects respond more positively than low need subjects (Hackman and Oldham, 1975) was appropriate, direct comparisons with previous studies which utilised a split-group correlational test of the hypothesis became difficult. A final problem in this area was that the inclusion of all of the independent variables in the regressions to predict the psychological states and outcome variables again made comparisons with previous findings difficult (Arnold and House, 1980).

Fourth, task identity was redefined to suit the university sample used in the current study. This makes comparisons with previous studies difficult.

Fifth, cultural differences may exist between the New Zealand sample employed in the present research, and the American sample on which the Job Characteristics Model was developed. As stated above, no normative data has been produced for the New Zealand sample. However, comparisons of JDS means both in the present sample and past research with a New Zealand sample (Glennie 1979) with American data indicate similarities in job perceptions.

Sixth, because of the many modifications made of the JDS in the current study, direct comparisons with past research must be treated with caution.

8. Suggestions for Future Research

Many criticisms have been focused on the Job Characteristics Model because of its apparent lack of distinction between objective and subjective measures and the perception of jobs (Aldag et al., 1981; Roberts and Glick, 1981). Although the present research was directed towards the clarification of the relationships between these two approaches, it would be useful to perform this research strategy in an applied work setting on a longitudinal experimental basis, with a job enlargement focus, employing a similar strategy to evaluate the job both objectively, using supervisors, and subjective measures rated by the job encumbents. The present research revealed a close relationship between objective measures and attendance. Future study could be directed towards the investigation of manipulation of objective dimensions with the view of observing changes in attendance levels.

The use of appropriate statistical techniques is essential to the development of a causal Job Characteristics Model. The author recommends the use of path analysis to assess the relationship between job analytic dimensions and job characteristics. No causal assessment of this relationship was made in the present study. Future researchers could, using path analysis, trace a causal path from the job analytic dimensions to the job characteristics, then to the psychological states, to an intervening satisfaction variable and finally, to the behavioural outcome variables.

The assessment of moderator variables using a split-sample correlational approach, while it enables direct comparisons of results with past research, is not an appropriate technique to evaluate a moderator effect (Zedeck, 1971). Modified multiple regression, introduced by Zedeck to assess the moderating effect of a variable, has been available for over fifteen years. The author suggests that it is time the technique was used more extensively.

Although little support was found for the moderating effects of need strength in this research a study of the extremes of growth needs may provide further insight into the need strength effects. However, as discussed above, the limitation of a model to a small percentage of a working population certainly is a major limitation on its potential utility.

The finding that general satisfaction predicted both performance and attendance was not in keeping with empirical research (Fisher, 1980) and may be due to the sample and the work under investigation. It is possible that this discrepancy highlights the applied work - university work differences, although the perceptions of job characteristics by the students rating their psychology course were similar in profile to the results produced from applied settings. Further application of the proposed model in this research (see Figure 4) may clarify this anomaly.

9. Changes to the Job Characteristics Model

In light of the findings from the present study, the author has several recommendations for modifications to the Job Characteristics Model. The relationship between the job characteristics and job analysis dimensions need further investigation. However, it is suggested that the objective measures may precede the job characteristics in the model, although the correlations between the two measures were low in the current study.

It is suggested that the additional contextual variable, physical working condition, and the two psychological states, challenge and role clarity made useful contributions to the model.

Adoption of the concept of measuring the presence/absence of employees using attendance instead of absenteeism may be beneficial to the utility of the model. There were two advantages to using this form of instrumentation. First, the present findings indicate that attendance is the primary predictor of work performance, and work performance is a vital component of the model (Hakell, 1986). Second, need strength was shown to moderate between the psychological states and attendance. This finding is comparatively unusual in the empirical literature, and may be due to the instrumentation of employee work attendance in the present study.

The hypothesis (Hackman and Oldham, 1975) that people with high need strength will respond more positively than others to a job which is high in motivating potential

needs modification. The present study indicates that a curvilinear relationship exists between the three GNS levels for work meaningfulness, knowledge of results, general satisfaction and work performance. It is suggested that differential predictions are made for each of the outcome variables. Based on the current findings, people with high GNS may have superior work attendance levels, people with medium need strength have higher work performance and subjects with low need strength are more motivated than other people.

Finally, it must be noted that the JDS utilised in the present study is in a much modified form, and as such must be compared with caution with past research.

It has been stated in the literature that the era of the JDS and Job Characteristics Theory is in its final death throws (Landy, 1985). This may be a premature judgement. Findings from the present research indicate the ongoing utility of the model in the understanding of work behaviour.

ACKNOWLEDGEMENTS

I would like to thank my supervisor, Bruce Jamieson, for his counsel and support in the conception and submission of this research, and for giving guidance and suggestions when necessary.

Many thanks are also due to Dr. Bill Rosenberg and to Dr. Simon Kemp for their advice and patience with my data analysis; and to Mr. Jim Pollard for his enthusiastic assistance with Macintosh word-processing. Thanks are due, too, to the stage one tutors and students who participated in this research.

Especially warm thanks go to my colleagues Selina Joe, Philippa Jones, Dianne Hendey, Donna Osborn, Ali Margaret and Lyn Schroder for their support and encouragement during the last eighteen months.

Greatful appreciation is extended to Jane Ashton, my mother, for her concern and spelling contributions. Thanks must also go to my father, sisters and extended family for their intermittent enquires as to the progress of this document.

My enduring gratitude goes to my husband, Hugh Martyn, for his invaluable support, in terms of both time and temper. The readability and logical flow of this maunscript has benefitted from his proof-reading.

REFERENCES

Adler, S., Skov, R. B. & Salvemini, N. J. (1985). Job characteristics and job satisfaction : When cause becomes consequence. Organisational Behaviour and Human Decision Processes, 35, 266-278.

Aldag, R. J., Barr, S. H. & Brief, A. P. (1981). Measurement of perceived task characteristics. Psychological Bulletin, 90(3), 415-431.

Aldag, R. J. & Brief, A. P. (1979). Task design and employee motivation. Illinois : Scott, Foresman & Co.

Alderfer, C. P. (1977). A critique of Salancik and Pfeffer's examination of need-satisfaction theories. Administrative Science Quarterly, 22, 658-669.

Algera, J. A. (1983). 'Objective' and perceived task characteristics as a determinant of reactions by task performers. Journal of Occupational Psychology, 56, 95-107.

Arnold, H. J. & House, R. J. (1980). Methodological and substantive extensions to the job characteristics model of motivation. Organisational Behaviour and Human Performance, 25, 161-183.

Birnbaum, P. H., Farh, J. L. & Wong, G. Y. Y. (1986). The job characteristics model in Hong Kong. Journal of Applied Psychology, 71(4), 598-605.

Blood, M. R. & Hulin, C. L. (1967). Alienation, environmental characteristics and worker responses. Journal of Applied Psychology, 51, 284-290.

Brass, D. J. (1985). Technology and the structuring of jobs : Employee satisfaction, performance and influence. Organisational Behaviour and Human Decision Processes, 35, 216-240.

Brayfield, A. H. & Crockett, W. H. (1955). Employee attitudes and employee performance. Psychological Bulletin, 52, 396-424.

Campion, M. A. & Thayer, P. W. (1985). Development and field evaluation of an interdisciplinary measure of job design. Journal of Applied Psychology, 70(1), 29-43.

Cherrington, D. L., Reitz, H. J. & Scott, W. E. (1971). Effects of contingent and noncontingent reward on the relationship between satisfaction and task performance. Journal of Applied Psychology, 55, 531-537.

Clegg, G. (1983). Psychology of employee lateness, absence and turnover : A methodological critique and empirical study. Journal of Applied Psychology, 68(1), 88-101.

Conant, E. H. & Kilbridge, M. D. (1965). An interdisciplinary analysis of job evaluation : technology, costs and behavioural implications. Industrial and Labour Relations Review, 3, 377-395.

Cook, J. D., Hepworth, S. J., Wall, T. D. & Warr, P. B. (Eds.). (1981). The experience of work : A compendium and review of 249 measures and their use. London : Academic Press Inc. (London) Ltd.

Cooley, W. W. & Lohnes, P. R. (1971). Multivatiate data analysis. Canada : John Wiley & Sons, Inc.

Cordery, J. L. & Wall, T. D. (1985). Work design and supervisory practice : A model. Human Relations, 38(5), 425-440.

Cummings, L. L. (1982). Organisational Behaviour. Annual Review of Psychology, 33, 541-579.

Davis, L. E. & Taylor, J. C. (Eds.). (1972). Design of jobs. Middlesex, England : Penguin Books Ltd.

Davis, L. F. & Valfer, E. S. (1965). Intervening responses to changes in supervisor job designs. Occupational Psychology, 39, 171-189.

De Nisi, A. S., Cornelius, E. T. & Blencoe, A. G. (1987). Further investigation of common knowledge effects of job analysis ratings. Journal of Applied Psychology, 72(2), 262-268.

Dean, J. W. & Brass, D. J. (1985). Social interaction and the perception of job characteristics in an organisation. Human Relations, 38(6), 571-582.

Dunham, R. B. (1976). The measurement and dimensionality of job characteristics. Journal of Applied Psychology, 61, 404-409.

Dunham, R. B. (1977). Relationships of perceived job design characteristics to job ability requirements and job value. Journal of Applied Psychology, 62(6), 760-763.

Dunham, R. B., Aldag, R. J. & Brief, A. P. (1977). Dimensionality of task design as measured by the JDS. Academy of Management Journal, 20(2), 209-223.

Dunham, R. B., Pierce, J. L. & Kolenko, T. (1979). Multiple Approaches to job design measurement and affective and behavioural responses to job design. Paper presented at the meeting of the National Academy of Management, Atlanta, August, 1979. In Aldag, Barr and Brief (1981).

Dunham, R. B., Pierce, J. L. & Newstrom, J. W. (1983). Job context and job content : A conceptual framework. Journal of Management, 9(2), 187-202.

Farh, J. L. & Scott, W. E. (1983). The experimental effects of 'autonomy' on performance and self-reports of satisfaction. Organisational Behaviour and Human Performance, 31, 203-222.

Ferratt, T. W., Dunham, R. B. & Pierce, J. L. (1981). Self-report measures of job characteristics and affective responses : An examination of discriminant validity. Academy of Management Journal, 24(4), 780-794.

Ferris, G. R. & Gilmore, D. G. (1984). The moderating role of work context in job design research : A test of competing models. Academy of Management Journal, 27(4), 885-892.

Ferris, G. R. & Gilmore, D. G. (1985). A methodological note on JCIs. Journal of Applied Psychology, 70(1), 225-227.

Fisher, C. D. (1980). On the dubious wisdom of expecting job satisfaction to correlate with performance. Academy of Management Review, 5(4), 607-612.

Fried, Y. & Ferris, G. R. (1986). The dimensionality of job characteristics : Some neglected issues. Journal of Applied Psychology, 71(3), 419-426.

Giniger, S., Dispenzieri, A. & Eisenberg, J. (1983). Age, experience and performance on speed and skill jobs in an applied setting. Journal of Applied Psychology, 68(3), 469-475.

Glennie, A. W. (1979). Core dimensions and the Job Diagnostic Survey : A New Zealand study. Unpublished Master's Thesis, University of Canterbury, New Zealand.

Graen, G. B., Scandura, T. A. & Graen, M. R. (1986). A field experimental test of the moderating effects of GNS on productivity. Journal of Applied Psychology, 71(3), 484-491.

Green, S. B., Armenakis, A. A., Marbert, L. D. & Bedeian, A. G. (1979). An evaluation of the response format and scale structure of the JDS. Human Relations, 32(2), 181-188.

Green, S. B. & Stutzman, T. (1986). An evaluation of methods to select respondents to structured job-analysis questionnaires. Personnel Psychology, 39, 543-564.

Greene, C. N. (1972). Relationships among role accuracy, compliance, performance evaluation and satisfaction within managerial dyads. Academy of Management Journal, 15(2), 205-215.

Greene, C. N. (1973). Pay, job satisfaction and performance. Journal of Applied Psychology, 58, 95-100.

Griffin, R. W. (1983). Objective and social sources of information in task redesign : A field experiment. Administrative Science Quarterly, 28, 184-200.

Guest, R. H. (1955). Men and machines : An assembly-line worker looks at his job. Personnel, 31, 3-10.

Hackman, J. R. & Lawler, E. E. (1971). Employee reactions to job characteristics. Journal of Applied Psychology, 55, 259-286.

Hackman, J. R. & Oldham, G. R. (1974). The JDS : An instrument for the diagnosis of jobs and the evaluation of job redesign projects. (Report No. 4). USA : Yale University, School of Organisation and Management.

Hackman, J. R. & Oldham, G. R. (1975). Development of the JDS. Journal of Applied Psychology, 60, 159-170.

Hackman, J. R. & Oldham, G. R. (1976). Motivation through the design of work : Test of a theory. Organisational Behaviour and Human Performance, 16, 250-279.

Hackman, J. R. & Oldham, G. R. (1980). Work redesign. Reading : Addison-Wesley.

Hackman, J. R., Pearce, J. L. & Wolfe, J. F. (1978). Effects of changes in job characteristics on work attitudes and behaviours : A naturally occuring quasi-experiment. Organisational Behaviour and Human Performance, 21, 289-304.

Hackman, J. R. & Suttle, J. L. (Eds.). (1977). Improving life at work : Behavioural science approaches to organisational change. California : Goodyear Pub. Co. Ltd.

Hakel, M. D. (1986). Personnel selection and placement. Annual Review of Psychology, 37, 351-380.

Harvey, J. H. & Weary, G. (1984). Current issues in Attribution theory and research. Annual Review of Psychology, 35, 427-459.

Harvey, R. T., Billings, R. S. & Nilan, K. J. (1985). Confirmatory factor analysis of the JDS : Good news and bad news. Journal of Applied Psychology, 70(3), 461-468.

Harvey, R. J. & Hayes, T. L. (1986). Monte Carlo baselines for inter-rater reliability correlates using the Position Analysis Questionnaire. Personnel Psychology, 39(2), 345-358.

Herzberg, F. (1966). Work and the nature of man. Cleveland : World. In Hackman & Oldham, 1976.

Herzberg, F., Mausner, B., Peterson, R. D. & Capwell, D. F. (1957). Job attitudes : A review of research and opinion. Pittsburg, Pa : Psychological Service of Pittsburg.

Herzberg, F., Mausner, B. & Snyderman, B. (1959). The motivation to work. New York : Wiley.

Hesketh, B. & Shouksmith, G. (1986). Job and non-job activities, job satisfaction and mental health among veterinarians. Journal of Occupational Behaviour, 7, 325-339.

Hogan, E. A. & Martell, D. A. (1987). A confirmatory structure equations analysis of the job characteristics model. Organisational Behaviour and Human Decision Processes, 39, 242-263.

Hulin, C. L. & Blood, M. R. (1968). Job enlargement, individual differences and worker responses. Psychological Bulletin, 69, 41-55.

Hull, C. H. & Nie, N. H. (Eds.). (1981). SPSS update 7 - 9 : New procedures and facilities for releases 7 - 9. USA : McGraw-Hill Inc.

Idaszak, J. R. & Drasgow, F. (1987). A revision of the Job Diagnostic Survey : Elimination of a measurement artifact. Journal of Applied Psychology, 72(1), 69-74.

Inkson, J. H. K. (1977). Workers' attitudes : An empirical study of the "technology" thesis. The Journal of Industrial Relations, 19(3), 241-253.

Kemp, N. J. & Cook, J. D. (1983). Job longevity and GNS as joint moderators of the task design - job satisfaction relationship. Human Relations, 36, 883-898.

Kerlinger, F. N. (1979). Behavioural reseach : A conceptual approach. USA : Holt, Rinehart & Winston.

Kim, J. O. & Mueller, C. W. (1978). Factor analysis : Statistical methods and practical issues. California : Sage Publications Inc.

Koch, S. (1959). Psychology : A study of a science. Vol. 2. New York : McGraw-Hill.

Landy, F. J. (1985). Psychology of work behaviour. Illinois : The Dorsey Press, 3rd edition.

Latham, G. P. & Pursell, E. D. (1975). Measuring absenteeism from the opposite side of the coin. Journal of Applied Psychology, 60, 369-371.

Latham, G. P. & Pursell, E. D. (1977). Measuring attendance : A reply to Ilgen. Journal of Applied Psychology, 62, 324-326.

Lee, R. & Wilbur, E. R. (1985). Age, education, job tenure, salary, job characteristics and job satisfaction : A multivariate analysis. Human Relations, 38(8), 781-791.

Liebetrau, A. M. (1983). Measures of association. California : Sage Publications Inc.

Loher, B. T., Noe, R. A., Moeller, N. L. & Fitzgerald, M. P. (1985). A meta-analysis of the relation of job characteristics to job satisfaction. Journal of Applied Psychology, 70(2), 280-289.

Maslow, A. H. (1943). A theory of human motivation. Psychological Review, 50, 370-396.

Maslow, A. H. (1954). Motivation and Personality. New York : Harper.

McCormick, E. J., Jeanneret, P. R. & Mecham, R. C. (1969). Position Analysis Questionnaire. Indiana : Purdue Research Foundation.

McCormick, E. J., Jeanneret, P. R. & Mecham, R. C. (1972). A study of job characteristics and job dimensions as based on the Position Analysis Questionnaire (PAQ). Journal of Applied Psychology, Monograph, 56(4), 347-368.

Mecham, R. C., McCormick, E. J. & Jeanneret, P. R. (1977a). Users' manual for the Position Analysis Questionnaire. Utah : PAQ Services Ltd.

Mecham, R. C., McCormick, E. J. & Jeanneret, P. R. (1977b). Technical manual (system 11). Utah : PAQ Services Ltd.

Montagno, R. V. (1985). The effects of comparison others and prior experience on responses to task design. Academy of Management Journal, 28(2), 491-498.

Muchinsky, P. M. (1983). Psychology applied to work : An introduction to industrial and organisational psychology. Illinois : The Dorsey Press.

Nie, N. H., Hull, C. H., Jenkins, J. G., Steinbrenner, K. & Bent, D. H. (1975). SPSS : Statistical package for the social sciences. (2nd edition). USA : McGraw-Hill Inc.

O'Brien, G. E. (1982). Evaluation of the job characteristic theory of work attitudes and performance. Australian Journal of Psychology, 34(3), 383-401.

Oldham, G. R. (1976). Job characteristics and internal motivation : The moderating effect of interpersonal and individual characteristics. Human Relations, 29(6), 559-569.

Oldham, G. R., Hackman, J. R. & Pierce, J. L. (1976). Conditions under which employees respond positively to enriched work. Journal of Applied Psychology, 61(4), 395-403.

Oldham, G. R., Hackman, J. R. & Stepina, L. P. (1978). Norms for the Job Diagnostic Survey. (Report No. 16). USA : Yale University, School of Organisation and Management.

Oldham, G. R. & Miller, H. E. (1979). The effect of significant other's job complexity on employee reactions to work. Human Relations, 32(3), 247-260.

Oldham, G. R., Nottenburg, G., Kassner, M. W., Ferris, G., Fedor, D. & Masters, M. (1982). The selection and consequences of job comparisions. Organisational Behaviour and Human Performance, 29, 84-111.

Orpen, C. (1979). The effects of job enrichment on employee satisfaction, motivation, involvement and performance : A field experiment. Human Relations, 32(3), 189-217.

Phillips, J. S. & Freedman, S. M. (1984). Situational performance and constraints and task characteristics : Their relationship to motivation and satisfaction. Journal of Management, 10(3), 321-331.

Pierce, J. L., McTavish, D. G. & Knudsen, K. R. (1986). The measurement of job characteristics : A content and contextual analytic look at scale validity. Journal of Occupational Behaviour, 7, 299-313.

Porter, L. W. & Lawler, E. E. (1968). Managerial attitudes and performance. Homewood Ill : Richard D. Irwin.

Porter, L. W. & Steers, R. M. (1973). Organisational, work and personal factors in employee turnover and absenteeism. Psychological Bulletin, 80(2), 151-176.

Rhodes, S. R. (1983). Age-related differences in work attitudes and behaviour : A review and conceptual analysis. Psychological Bulletin, 93(2), 328-367.

Roberts, K. H. & Glick, W. (1981). The job characteristics approach to task design : A critical review. Journal of Applied Psychology, 66(2), 193-217.

Rousseau, D. M. (1977). Technological differences in job characteristics, employee satisfaction and motivation : A synthesis of job design research and socio-technical systems theory. Organisational Behaviour and Human Performance, 19, 18-42.

Rousseau, D. M. (1982). Job perceptions when working with data, people and things. Journal of Occupational Psychology, 55, 43-52.

Roznowski, M. & Hulin, C. L. (1985). Influences of functional speciality and job technology on employee's perceptual and affective responses to their jobs. Organisational Behaviour and Human Decision Processes, 36, 186-208.

Salancik, G. R. & Pfeffer, J. (1977). An examination of need-satisfaction models of job attitudes. Administrative Science Quarterly, 22, 427-456.

Schnake, M. E., Bushardt, S. C. & Spottswood, C. (1984). Internal work motivation and intrinsic job satisfaction : The effects of goal clarity, goal difficulty, participation in goal setting and task complexity. Group and Organisational Studies, 9(2), 201-219.

Schnake, M. E. & Dumler, M. P. (1985). Affective response bias in the measurement of perceived task characteristics. Journal of Occupational Psychology, 58, 159-166.

Schneider, B. (1985). Organisational behaviour. Annual Review of Psychology, 36, 573-611.

Schwab, D. P. & Cummings, L. L. (1976). A theoretical analysis of the impact of task scope on employee performance. Academy of Management Review, 1, 23-35.

Shaw, J. B. (1980). An information-processing approach to the study of job design. Academy of Management Review, 51, 41-48.

Sheridan, J. E. & Slocum, J. W. (1975). The direction of the causal relationship between job satisfaction and job performance. Organisational Behaviour and Human Performance, 14, 159-172.

Sims, H. P., Szilagyi, A. D. & Keller, R. T. (1976). The measurement of job characteristics. Academy of Management Journal, 19, 195-212.

Spector, P. E. (1985). Higher-order need strength as a moderator of the job scope - employee outcome relationship : A meta-analysis. Journal of Occupational Psychology, 58, 119-127.

Staw, B. M. (1975). Attribution of the 'causes' of performance : A general alternative interpretation of cross-sectional research on organisations. Organisational Behaviour and Human Performance, 13, 414-432.

Staw, B. M. (1984). Organisational behaviour : A review and reformulation of the field's outcome vars. Annual Review of Psychology, 35, 627-666.

Steers, R. M. & Mowday, R. T. (1977). The motivational properties of tasks. Academy of Management Review, 2, 645-658.

Steers R. M. & Porter, L. W. (1979). Motivation and Work Behaviour. 2nd Edition. Tokyo : McGraw-Hill Inc.

Steers, R. M. & Rhodes, S. R. (1978). Major influences on employee attendance : A process model. Journal of Applied Psychology, 63(4), 391-407.

Taber, T. D., Beehr, T. A. & Walsh, J. T. (1985). Relationships between job evaluation ratings and self-ratings of job characteristics. Organisational Behaviour and Human Decision Processes, 35, 27-45.

Taylor, F. W. (1911). The principles of scientific management. New York : Harper & Row.

Tenopyr, M. L. & Oeltjen, P. D. (1982). Personnel selection and classification. Annual Review of Psychology, 33, 581-618.

Tharenou, P. & Harker, P. (1984). Moderating influence of self-esteem in relationships between job complexity, performance and satisfaction. Journal of Applied Psychology, 69(4), 623-632.

Thomas, J. & Griffin, R. (1983). The social information processing model of task design : A review of the literature. Academy of Management Review, 8(4), 672-682.

Torrington, D. & Chapman, J. (1983). Personnel Management. (2nd Edition). London : Prentice-Hall International, Inc.

Turner, A. N. & Lawrence, P. R. (1965). Industrial jobs and the worker : An investigation of response to task attributes. Cambridge, Mass. : Harvard Graduate School of Administration.

Tyagi, P. K. (1985). Relative importance of key job dimensions and leadership behaviours on motivating salesperson work performance. Journal of Marketing Behaviour, 49, 76-86.

Umstot, D. D., Bell, C. H. & Mitchell, T. R. (1976). Effects of job enrichment and task goals on satisfaction and productivity : Implications for job design. Journal of Applied Psychology, 61(4), 379-394.

Vance, R. J. & Biddle, T. F. (1985). Task experience and social cues : Interactive effects on attitudinal reactions. Organisational Behaviour and Human Desision Processes, 35, 252-265.

Vroom, V. H. (1964). Work and motivation. New York : John Wiley and Sons.

Walker, C. R. (1950). The problem of the repetitive job. Harvard Business Review, 28, 54-58.

Walker, H. A. & Fennell, M. L. (1986). Gender differences in role differentiation and organisational task performance. Annual Review of Sociology, 12, 255-275.

Walsh, J. T., Taber, T. D. & Beehr, T. A. (1980). An integrated model of perceived job characteristics. Organisational Behaviour and Human Performance, 25, 252-267.

Wanous, J. P. (1974). A causal-correlational analysis of the job satisfaction and performance relationship. Journal of Applied Psychology, 59, 139-144.

Watson, C. J., Watson, K. D. & Stowe, J. D. (1985). Univariate and multivariate distributions of the JDI's measures of job satisfaction. Organisational Behaviour and Human Decision Processes, 35, 241-251.

Weiss, H. M. & Shaw, J. B. (1979). Social influences on judgements and tasks. Organisational Behaviour and Human Performance, 24, 126-140.

Zedeck, S. (1971). Problems with the use of "moderator" variables. Psychological Bulletin, 76(4), 295-310.

APPENDIX A

C O U R S E D I A G N O S T I C S U R V E Y

On the following pages, you will find several different kinds of questions about your Psyc Stage One course work. Specific instructions are given at the start of each section. Please read them carefully. It whould take no more than 25 minutes to complete the entire questionnaire. Please move through it quickly.

The questions are designed to obtain <u>your</u> perceptions of the job and <u>your</u> reactions to it.

There are no "trick" questions. Your individual answers will be kept completely confidential. Please answer each item as honestly and frankly as possible.

Thank you for your co-operation.

<u>N.B</u>. Please keep in mind that the course work includes attendance of lectures and labs, lab reports, essays, a statistics test, a mid-year and a final exam.

SECTION ONE

This part of the questionnaire asks you to describe your Stage One Psyc course work, as objectively as you can.

Please do not use this part of the questionnaire to show how much you like or dislike your course work. Questions about that will come later. Instead, try to make your descriptions as accurate and as objective as you possibly can.

A sample question is given below.

A. To what extent does your course work require you to work with mechanical equipment?

1----------2----------3----------4----------5---------(6)---------7

Very little; the course work requires almost no contact with mechanical equipment of any kind.	Moderately	Very much; the course work requires almost constant work with mechanical equipment.

You are to circle the number which is the most accurate description of your course work.

If, for example, your course work requires you to work with mechanical equipment a good deal of the time - but also requires some paperwork - you might circle the number six, as was done in the example above.

If you do not understand these instructions, please ask for assistance. If you do understand them, turn the page and begin.

1. To what extent does your course work require you to work closely with other people (either your lab group, your tutor, your teaching fellow, lecturers, etc.)?

1	2	3	4	5	6	7
Very little; dealing with other people is not at all necessary in doing the course work.		Moderately; some dealing with others is necessary.				Very much; dealing with other people is an absolutely essential & crucial part of doing the course work.

2. How much autonomy is there in your course work? That is, to what extent does your course work permit you to decide on your own how to go about doing the work?

1	2	3	4	5	6	7
Very little; the course work gives me almost no personal "say" about how and when the work is done.		Moderate autonomy; many things are standardized and not under my control, but I can make some decisions about the work.				Very much; the course work gives me almost complete responsibility for deciding how and when the work is done.

3. How much variety is there in your course work? That is, to what extent does the course work require you to do many different things at work, using a variety of your skills and talents?

1	2	3	4	5	6	7
Very little; the course work requires me to do the same routine things over and over again.		Moderate variety				Very much; the course work requires me to do many different things, using a number of different skills and talents.

4. In general, how significant or important is your course work? That is, are the results of your work likely to significantly affect your final Stage One Psyc course grade?

1	2	3	4	5	6	7
Not very significant; the outcomes of my work are not likely to have important affects on my final grade.		Moderately significant.				Highly significant; the outcomes of my work can substantially affect my final grade.

5. To what extent does your tutor let you know how well you are doing on your course work?

1----------2----------3----------4----------5----------6----------7

Very little; he/she almost never lets me know how well I am doing.	Moderately: sometimes he/she may give me "feedback"; other times he/she may not.	Very much; my tutor provides me with almost constant "feedback" about how well I am doing.

6. To what extent does doing the course work itself provide you with information about your work performance? That is, does the actual work itself provide clues about how well you are doing - aside from any "feedback" your tutor may provide?

1----------2----------3----------4----------5----------6----------7

Very little; the course work itself is set up so I could work forever without finding out how well I am doing.	Moderately; sometimes doing the course work provides "feed back" to me; sometimes it does not.	Very much; the course work is set up so that I get almost constant "feedback" as I work about how well I am doing.

7. How do your physical working conditions affect the way you do your course work?

1----------2----------3----------4----------5----------6----------7

They make it very difficult.	They make very little difference.	They help me a great deal.

8. How much challenge is there in your course work?

1----------2----------3----------4----------5----------6----------7

There is very little challenge; I don't get a chance to use any special skills and abilities and I never have jobs which require all my abilities to complete them successfully.	Moderate challenge.	There is a great deal of challenge in my course work; I get a chance to use my special skills and abilities and often have jobs which require all my abilities to complete them successfully.

9. To what extent is your course work structured so that you can complete significant topics within psychology?

1----------2----------3----------4----------5----------6----------7

Very little; I complete only a small part of a topic on this course.	Moderately.	Very much; I am able to complete whole and significant topics on this course.

SECTION TWO

Listed below are a number of statements which could be used to describe a job.

You are to indicate whether each statement is an accurate or an inaccurate description of your Stage One Psyc Course Work.

Once again, please try to be as objective as you can in deciding how accurately each statement describes your course work - regardless of whether you like or dislike your course work.

Write a number in the blank beside each statement, based on the following scale:

HOW ACCURATE IS THE STATEMENT IN DESCRIBING YOUR JOB?

1	2	3	4	5	6	7
Very inaccurate	Mostly inaccurate	Slightly inaccurate	Uncertain	Slightly accurate	Mostly accurate	Very accurate

____ 1. The course work requires me to use a number of complex or high-level skills.

____ 2. The course work requires a lot of co-operative work with other people.

____ 3. The course work is arranged so that I complete significant topics within psychology on this course.

____ 4. Just doing the work required by the course work provides many chances for me to figure out how well I am doing.

____ 5. The course work is quite simple and repetitive.

____ 6. The course work can be done adequately by a person working alone - without talking or checking with other people.

____ 7. The tutors on this course almost never give me any "feedback" about how well I am doing in my work.

____ 8. How well I do my course work can affect my final Stage One Psyc grade.

____ 9. The course work denies me any chance to use my personal initiative or judgement in carrying out the work.

____ 10. My tutor often let me know how well he/she thinks I am performing the course work.

____ 11. In my course work, I am able to complete only a small part of a topic on this course.

____ 12. The course work provides very few clues about whether or not I am performing well.

1	2	3	4	5	6	7
Very inaccurate	Mostly inaccurate	Slightly inaccurate	Uncertain	Slightly accurate	Mostly accur-ate	Very Accurate

____ 13. The course work gives me considerable opportunity for independence and freedom in how I do the work.

____ 14. The course work itself is not very significant or important in the broader scheme of things.

____ 15. Most of the time I know what I have to do in my course work.

____ 16. To be successful in my course work requires all my skill and ability.

SECTION THREE

Now please indicate how you personally feel about your Stage One Psyc course work.

Each of the statements below is something that a person might say about his or her course work. You are to indicate your own personal feelings about your course work by marking how much you agree with each of the statements.

Write a number in the blank beside each statement, based on this scale:

HOW MUCH DO YOU AGREE WITH THE STATEMENT?

1	2	3	4	5	6	7
Disagree strongly	Disagree	Disagree slightly	Neutral	Agree slightly	Agree	Agree strongly

____ 1. It's hard, on this course, for me to care very much about whether or not the work gets done right.

____ 2. My opinion of myself goes up when I do my course work well.

____ 3. Generally speaking, I am very satisfied with this course.

____ 4. Most of the things I have to do on this course seem useless or trivial.

____ 5. I usually know whether or not my work is satisfactory on this course.

____ 6. I feel a great sense of personal satisfaction when I do my course work well.

____ 7. The work I do on this course is very meaningful to me.

____ 8. I feel a very high degree of personal responsibility for the work I do on this course.

____ 9. I frequently think of quitting this course.

____ 10. I feel bad and unhappy when I discover that I have performed poorly on this course.

____ 11. I often have trouble figuring out whether I'm doing well or poorly on this course.

____ 12. I feel I should personally take the credit or blame for the results of my work on this course.

____ 13. I am generally satisfied with the kind of work I do in this course.

____ 14. My own feelings generally are not affected much one way or the other by how well I do on this course.

1	2	3	4	5	6	7
Disagree strongly	Disagree	Disagree slightly	Neutral	Agree slightly	Agree	Agree strongly

____ 15. Whether or not my course work gets done right is clearly my responsibility.

____ 16. Most of my tasks are clearly defined in my course work.

____ 17. In my course work, I seldom get a chance to use my special abilities and skills.

____ 18. My physical work conditions have a favourable influence on my overall attitude to my work.

SECTION FOUR

Now please indicate how satisfied you are with each aspect of your course work listed below. Once again, write the appropriate number in the blank beside each statement.

HOW SATISFIED ARE YOU WITH THIS ASPECT OF YOUR COURSE WORK?

1	2	3	4	5	6	7
Extremely dissatisfied	Dissatisfied	Slightly dissatisfied	Neutral	Slightly satisfied	Satisfied	Extremely satisfied

____ 1. The amount of personal growth and development I get in doing my course work.

____ 2. The people I talk to and work with on my course.

____ 3. The degree of respect and fair treatment I receive from my tutor.

____ 4. The feeling of worthwhile accomplishment I get from doing my course work.

____ 5. The chance to get to know other people while on the course.

____ 6. The amount of support and guidance I receive from my tutor.

____ 7. The amount of independent thought and action I can exercise in my course work.

____ 8. The chance to help other people while at work on the course.

____ 9. The amount of challenge in my course work.

____ 10. The overall quality of the supervision I receive in my work.

____ 11. The degree to which I know what is expected of me.

____ 12. My course work is very challenging.

____ 13. How I feel about my physical working conditions.

SECTION FIVE

Now please think of the other people in your course.

Please indicate how accurately each of the statements describes the feelings of those people about the course work.

It is quite alright if your answers here are different from when you described your own reactions to the course work. Often different people feel quite differently about the same work.

Once again, write a number in the blank beside each statement, based on this scale:

HOW MUCH DO YOU AGREE WITH THE STATEMENT?

1	2	3	4	5	6	7
Disagree strongly	Disagree	Disagree slightly	Neutral	Agree slightly	Agree	Agree strongly

____ 1. Most people on this course feel a great sense of personal satisfaction when they do the course work well.

____ 2. Most people on this course are very satisfied with the work.

____ 3. Most people on this course feel that the work is useless or trivial.

____ 4. Most people on this course feel a great deal of personal responsibility for the work they do.

____ 5. Most people on this course have a pretty good idea of how well they are performing their work.

____ 6. Most people on this course find the work very meaningful.

____ 7. Most people on this course feel that whether or not the job gets done right is clearly their own responsibility.

____ 8. People on this course often think of quitting.

____ 9. Most people on this course feel bad or unhappy when they find that they have performed the work poorly.

____ 10. Most people on this course have trouble figuring out whether they are doing a good or a bad job.

____ 11. Most people on this course find the work challenging and interesting.

SECTION SIX

Listed below are a number of characteristics which could be present on any job. People differ about how much they would like to have each characteristic present their own jobs. We are interested in learning how much you personally would like to have each one present in ANY job you choose to do.

Using the scale below, please indicate the degree to which you would like to have each characteristic present in a job.

NOTE: The numbers of this scale are different from those used in previous scales.

4	5	6	7	8	9	10
Would like having this only a moderate amount (or less)			Would like having this very much			Would like having this extremely much

____ 1. High respect and fair treatment from my tutor or supervisor.

____ 2. Stimulating and challenging work.

____ 3. Chances to exercise independent thought and action in my job.

____ 4. Great job security.

____ 5. Very friendly co-workers.

____ 6. Opportunities to learn new things from my work.

____ 7. High salary and good fringe benefits.

____ 8. Opportunities to be creative and imaginative in my work.

____ 9. Quick promotions.

____ 10. Opportunities for personal growth and development in my job.

____ 11. A sense of worthwhile accomplishment in my work.

____ 12. A clear idea of what is expected of me in my work.

SECTION SEVEN

People differ in the kinds of jobs they would most like to hold. The questions in this section give you a chance to say just what it is about a job that is important to you.

For each question, two different kinds of jobs are briefly described. You are to indicate which of the jobs you personally would prefer - if you had to make a choice between them.

In answering each question, assume that everything else about the jobs is the same. Pay attention only to the characteristics actually listed.

Two examples are given below:

JOB A				JOB B
A job requiring work with mechanical equipment most of the day				A job requiring work with other people most of the day
1	2	(3)	4	5
Strongly Prefer A	Slightly Prefer A	Neutral	Slightly Prefer B	Strongly Prefer B

If you like working with people and working with equipment equally well, you would circle the number 3, as has been done in the example.

Here is another example. This one asks for a harder choice - between two jobs which both have some undesirable features.

JOB A				JOB B
A job requiring you to expose yourself to considerable physical danger.				A job located 200 miles from your home and family.
1	(2)	3	4	5
Strongly Prefer A	Slightly Prefer A	Neutral	Slightly Prefer B	Strongly Prefer B

If you would slightly prefer risking physical danger to working far from your home, you would circle number 2, as has been done in the example.

Please ask for assistance if you do not understand exactly how to do these questions.

	JOB A			JOB B
1.	A job where the pay is very good.			A job where there is considerable opportunity to be creative and innovative
	1	2	3	4 5
	Strongly Prefer A	Slightly Prefer A	Neutral	Slightly Prefer B / Strongly Prefer B
2.	A job where you are often required to make important decisions.			A job with many pleasant people to work with.
	1	2	3	4 5
	Strongly Prefer A	Slightly Prefer A	Neutral	Slightly Prefer B / Strongly Prefer B
3.	A job in which greater responsibility is given to those who do the best work.			A job in which greater responsibility is given to loyal employees who have the most seniority.
	1	2	3	4 5
	Strongly Prefer A	Slightly Prefer A	Neutral	Slightly Prefer B / Strongly Prefer B
4.	A job in an organization which is in financial trouble and might have to close down within the year.			A job in which you are not allowed to have any say whatever in how your work is scheduled, or in the procedures to be used in carrying it out.
	1	2	3	4 5
	Strongly Prefer A	Slightly Prefer A	Neutral	Slightly Prefer B / Strongly Prefer B
5.	A very routine job.			A job where your co-workers are not very friendly.
	1	2	3	4 5
	Strongly Prefer A	Slightly Prefer A	Neutral	Slightly Prefer B / Strongly Prefer B
6.	A job with a supervisor who is often very critical of you and your work in front of other people.			A job which prevents you from using a number of skills that you worked hard to develop.
	1	2	3	4 5
	Strongly Prefer A	Slightly Prefer A	Neutral	Slightly Prefer B / Strongly Prefer B

	JOB A			JOB B
7.	A job with a supervisor who respects you and treats you fairly.			A job which provides constant opportunities for you to learn new and interesting things

1	2	3	4	5
Strongly Prefer A	Slightly Prefer A	Neutral	Slightly Prefer B	Strongly Prefer B

8.	A job where there is a real chance you could be laid off.			A job with very little chance to do challenging work.

1	2	3	4	5
Strongly Prefer A	Slightly Prefer A	Neutral	Slightly Prefer B	Strongly Prefer

9.	A job in which there is a real chance for you to develop new skills and advance in the organization.			A job which provides lots of vacation time and an excellent fringe benefit package.

1	2	3	4	5
Strongly Prefer A	Slightly Prefer A	Neutral	Slightly Prefer B	Strongly Prefer

10.	A job with little freedom and independence to do your work in the way you think best.			A job where the working conditions are poor.

1	2	3	4	5
Strongly Prefer A	Slightly Prefer A	Neutral	Slightly Prefer B	Strongly Prefer B

11.	A job with very satisfying team-work.			A job which allows you to use your skills and abilities to the fullest extent.

1	2	3	4	5
Strongly Prefer A	Slightly Prefer A	Neutral	Slightly Prefer B	Strongly Prefer B

12.	A job which offers little or no challenge			A job which requires you to be completely isolated from co-workers

1	2	3	4	5
Strongly Prefer A	Slightly Prefer A	Neutral	Slightly Prefer B	Strongly Prefer B

SECTION EIGHT

Please tick the category to which you belong:

Biographical Background

1. Sex: Male ___ Female ___

2. Age (tick one)

20 years and under _____.

21-25 _____ 26-30 _____ 31-35 _____ 36-40 _____

41-45 _____ 46-50 _____ 51-55 _____ 56-60 _____

61 and over _____

3. Education:

_____ Number of years spent at university
(if this is your first year, write "1")

Answer"Y" (Yes) or "N" (No) to the following:

_____ Do you intend to major in psychology?

_____ Have you ever had a full-time paid job that lasted more than three months?

_____ Do you like the Stage One Psyc Course?

_____ Have you handed in your lab book?

_____ Has your lab book been returned to you, marked?

Thank you for your co-operation. Please hand in your completed form.

APPENDIX B

Modifications to the JDS

It was necessary to modify the JDS to some extent to encompass the university context. The work under assessment was the "course work of a Stage One Psychology student". An instructional note was added to the initial introductions : "N.B., Please keep in mind that the course work includes attendance of lectures and labs, lab reports, essays, a statistics test, a mid-year and a final exam". This note reminded the subjects of the expectations placed upon them by the Department of Psychology, namely the completion of the above criteria, and that these defined criteria were to be used in the student's rating of the course work using the JDS.

Measures of pay satisfaction and security satisfaction in Section four were deleted, as they are inappropriate to the student situation. However, those in the "would like" section (Section six) were retained.

To clarify the work context to the subject population, the word "job" was substituted with the phrase "*course work*". References to the organisation or to clients were also inappropriate and were changed. E.g., In Section one, question one:

"To what extent does your job require you to work closely with other people (either 'clients' or people in related jobs in your own organisation)?"

The bracketed phrase was changed to :

"either your lab group, your tutor, your teaching fellow, lecturers, etc.)?"

The job dimension of *task identity* was re-defined, from involving the "completion of a 'whole' and identifiable piece of work" to the "completion of significant topics within psychology". E.g., In Section one question three :

"To what extent does your job involve doing a whole and identifiable piece of work? That is, is the job a complete piece of work that has an obvious beginning and

end? Or is it only a small part of the overall piece of work, which is finished by other people or by automatic machines?

1 My work is only a tiny part of the overall piece of work; the results of my activities cannot be seen in the final product or service.
4 My job is a moderate sized 'chunk' of the overall piece of work; my own contribution can be seen in the final outcome.
7 My job involves doing the whole piece of work, from start to finish; the results of my activities are easily seen in the final product or service.

The equivalent question in the modified version of the JDS became :
"To what extent is your course work structured so that you can complete significant topics within psychology?"

1 Very little, I complete only a small part of a topic on this course.
4 Moderately.
7 Very much, I am able to complete whole and significant topics on this course.

The job dimension of *task significance* was re-defined. Section one, question five "... are the results of your work likely to significantly affect the lives or well-being of other people" was changed to the more subjective question : "... are the results of your work likely to significantly affect your final stage one Psychology course grade?".

Some further more minor changes were also considered necessary. The dimension feedback from agents was changed to feedback from your Tutor. Section three, question nine was changed from : "I frequently think of quitting this job", to "I frequently think of quitting this course". In Section four, question five, 'boss' was substituted with 'tutor'.

The instructions for Section six were modified from : "Listed below are a question of characteristics which could be present on any job. People differ about how much they would like to have each one present in their own jobs. We are interested in learning how much you personally would like to have each one present in your job.

Using the scale below, please indicate the degree to which you would like to have each characteristic present in your job".

The modified instructions involved alterations to the final two sentences which were changed to read : "We are interested in learning how much you personally would like to have each one present in ANY job you choose to do. Using the scale below, please indicate the degree to which you would like to have each characteristic present in a job". That is, the subjects were not asked to rate how much of each characteristic they would like present in their jobs as stage one Psychology students, they were asked to rate ANY job they may choose to do, now or in the future.

In Section eight, the age ranges were broken down from ten year categories, as used in the original JDS, to five year groups. As the student population was predominantly a young one, response variation may have been lost in the broader categories.

The education component in Section eight was entirely eliminated. To attain entry to the stage one course, and indeed to the university, the students' academic performance must be to the U.E. level (or to some equivalent standard). As the subjects were stage one students, it was inappropriate to question their attainment (or not) of a university degree, etc. The job title question was deleted on the same grounds.

Instead, the subjects were asked to respond to the following questions :

- How many years have you spent at university?
- Do you intend to major in psychology?
- Have you ever had a full-time paid job that lasted more than three months?
- Do you like the stage one Psychology course?
- Have you handed in your lab book?
- Has your lab book been returned to you, marked?

NEW VARIABLES

Role Clarity, Challenge and *Physical Working Conditions* were added to the JDS.

Role clarity was measured by three items from the Michigan Organisational Assessment Questionnaire (Cammann, Fichman, Jenkins and Klesh, 1979; Seashore, Lawler, Mirvis and Cammann, 1982). Modifications are detailed below. The MOAQ version was :

(i) "On my job, most of my tasks are clearly defined".

This became :

"Most of my tasks are clearly defined in my course work". (Section three, question sixteen).

(ii) "Most of the time I know what I have to do on my job". The modified version was :

"Most of the time I know what I have to do in my course work". (Section two, question fifteen).

(iii) "On my job, I know exactly what is expected of me". This became:

"A clear idea of what is expected of me in my work". (Section six, question twelve). This change was made after feedback from the pilot study indicated that the original version of the question had implications of performance levels, i.e., attained grades. The modified version appeared to more closely compare with the measure role clarity.

Challenge This variable was measured by four items from the Michigan Organisational Assessment Questionnaire (1979, 1982). Modifications are detailed below.

The word 'job' was again substituted with the phrase 'course work', as follows :

(i) "How much challenge is there in your course work?"

1 There is very little challenge; I don't get a chance to use any special skills and abilities and I never have jobs which require all my abilities to complete them successfully.

4 Moderate challenge.

7 There is a great deal of challenge in my course work; I get a chance to use my special skills and abilities and I often have jobs which require all of my abilities to complete them successfully. (Section one, question eight)

(ii) "To be successful in my course work requires all my skill and ability". (Section two, question sixteen).

(iii) "In my course work, I seldom get a chance to use my special abilities and skills". (Section three, question seventeen).

(iv) "My course work is very challenging". (Section four, question twelve).

A fifth item was manufactured for the 'other people' section (Section five, question eleven) :

(v) "Most people on this course find the work challenging and interesting".

Physical Working Conditions This variable was assessed using three measures from the Index of Organisational Reactions (Smith, 1962, 1976). Modifications are detailed below.

The word 'job' was again substituted with 'course work'.

(i) "How do your physical working conditions affect the way you do your course work?".

1 They make it very difficult.

4 They make very little difference.

7 They help me a great deal. (Section one, question seven).

(ii) Physical working conditions have a favourable influence on my overall attitude to my work". (Section three, question eighteen).

(iii) "How I feel about my physical working conditions". (Section four, question thirteen).

APPENDIX C

J O B D I A G N O S T I C S U R V E Y

JOB RATING FORM

This questionnaire was developed as part of a Yale University study of jobs and how people react to them. The questionnaire helps to determine how jobs can be better designed, by obtaining information about how people react to different kinds of jobs.

You are asked to rate the characteristics of the following job:

STAGE ONE PSYCHOLOGY COURSE WORK

Please keep in mind that the questions refer to the job listed above, and NOT to your own job.

On the following pages, you will find several different kinds of questions about the job listed above. Specific instructions are given at the start of each section. Please read them carefully. It should take you no more than 10 minutes to complete the entire questionnaire. Please move through it quickly.

(N.B. Please keep in mind that the course work includes lectures, lab reports, essays, a statistics test, a mid-year and a final exam.)

SECTION ONE

This part of the questionnaire asks you to describe Stage One Psyc Course as objectively as you can. Try to make your descriptions as accurate and as objective as you possibly can.

A sample question is given below.

A. To what extent does the job require a person to work with mechanical equipment?

1----------2----------3----------4----------5----------(6)----------7

Very little; the job requires almost no contact with mechanical equipment of any kind.

Moderately

Very much; the job requires almost constant work with mechanical equipment

You are to circle the number which is the most accurate description of the job listed on the front page.

If, for example, the job requires a person to work with mechanical equipment a good deal of the time--but also requires some paperwork-- you might circle the number six, as was done in the example above.

1. To what extent does the course work require a person to work closely with other people (either their tutor, other members of their lab group, or lectures)?

1---------2---------3---------4---------5---------6----------7

Very little; dealing with other people is not at all necessary in doing the course work.	Moderately; some dealing with others is necessary	Very much; dealing with other people is an absolutely essential and crucial part of doing the course work.

2. How much autonomy is there in the course? That is, to what extent does the course work permit a person to decide on his or her own how to go about doing the work?

1---------2---------3---------4---------5---------6----------7

Very little; the course work gives a person almost no personal "say" about how and when the work is done.	Moderate autonomy; many things are standardized and not under the control of the person, but he or she can make some decisions about the work.	Very much; the course work gives the person almost complete responsibility for deciding how and when the work is done.

3. How much variety is there in the course work? That is, to what extent does the course work require a person to do many different things at work, using a variety of his or her skills and talents?

1---------2---------3---------4---------5---------6----------7

Very little; the course work requires the person to do the same routine things over and over again.	Moderate variety.	Very much; the course work requires the person to do many different things, using a number of different skills and talents.

4. In general, how significant or important is the job? That is, are the results of the person's work likely to significantly affect his/her final Stage One Psyc course grade?

1---------2---------3---------4---------5---------6----------7

Not at all significant; the outcomes of the work are not likely to affect his/her final grade.	Moderately significant.	Highly significant; the outcomes of the work can significantly affect his/her final grade

5. To what extent do tutors let the person know how well he or she is doing on the job?

1---------2---------3---------4---------5---------6----------7

Very little; they almost never let the person know how well he or she is doing.	Moderately; sometimes tutors may give the person "feedback"; other times they may not.	Very much; they provide the person with almost constant "feedback" about how well he or she is doing.

6. To what extent does doing the course work itself provide the person with information about his or her work performance? That is, does the actual work itself provide clues about how well the person is doing - aside from any "feedback" tutors may provide?

1---------2---------3---------4---------5---------6----------7

Very little; the course work itself is set up so a person could work forever without finding out how well he or she is doing.	Moderately; sometimes doing the course work provides "feedback" to the person; sometimes it does not.	Very much; the course work is set up so that a person gets almost constant "feedback" as he or she works about how well he or she is doing.

7. To what extent are the demands/requirements of the course made apparent to a student?

1---------2---------3---------4---------5---------6----------7

To a very low extent. The course requirements are outlined in handouts with no further prompts.	Moderately	To a large extent. The requirements of the course work are frequently mentioned, as well as being documented in handouts.

8. How much challenge is there in the course work?

1---------2---------3---------4---------5---------6----------7

Very little challenge; a person does not get a chance to use any special skills and abilities and never has tasks that require all of his/her abilities to complete them successfully.	Moderate Challenge	A great deal of challenge; a person gets a chance to use his/her special abilities and skills and often has tasks which require all of his/her abilities to complete them. successfully.

9. To what extent is the course work structured so that the students can complete significant topics within psychology?

1---------2---------3---------4---------5---------6----------7

To a very low extent; a student completes only a small part of a topic on this course.	Moderately	To a large extent. A student is able to complete whole and significant topics on this course.

SECTION TWO

Listed below are a number of statements which could be used to describe a job.

You are to indicate whether each statement is an accurate or an inaccurate description of the Stage One Psychology Course Work.

Once again, please try to be as objective as you can in deciding how accurately each statement describes the work--regardless of your own feelings about that work.

Write a number in the blank beside each statement, based on the following scale:

HOW ACCURATE IS THE STATEMENT IN DESCRIBING THE STAGE ONE PSYC COURSE WORK?

1	2	3	4	5	6	7
Very inaccurate	Mostly inaccurate	Slightly inaccurate	Uncertain	Slightly accurate	Mostly accurate	Very accurate

_____ 1. The course requires a person to use a number of complex or sophisticated skills.

_____ 2. The course requires a lot of co-operative work with other people.

_____ 3. The course work is arranged so that a person can complete only a small part of a topic within psychology on this course.

_____ 4. Just doing the work required by the course provides many chances for a person to figure out how well he or she is doing.

_____ 5. The course work is quite simple and repetitive.

_____ 6. The course work can be done adequately by a person working alone-without talking or checking with other people.

_____ 7. The tutors on the course almost never give a person any "feedback" about how well he or she is doing the work.

_____ 8. A person's final Stage One Psyc grade can be affected by how well the work gets done.

_____ 9. The course work denies a person any chance to use his or her personal initiative or discretion in carrying out the work.

_____10. Supervisors often let the person know how well they think he or she is performing the work.

_____11. The course work involves a person completing whole and significant topics on this course.

1	2	3	4	5	6	7
Very Inaccurate	Mostly Inaccurate	Slightly Inaccurate	Uncertain	Slightly Accurate	Mostly Accurate	Very Accurate

_____ 12. The course work itself provides very few clues about whether or not the person is performing well.

_____ 13. The course work gives a person considerable opportunity for independence and freedom in how he or she does the work.

_____ 14. The course work itself is not very significant or important in the broader scheme of things.

_____ 15. The physical working conditions tend to make it difficult for a person to do the course work.

_____ 16. On the course, most of the tasks are clearly defined.

_____ 17. The course work is very challenging.

SECTION THREE

General Information

1. Sex: Male _____ Female _____

2. What is your age? (Tick one)

____ under 20 ____ 40-49

____ 20-29 ____ 50-59

____ 30-39 ____ 60 or over

3. How long have you been in your present position? (Tick one)

____ 0-½ year ____ 3-5 years

____ ½-1 year ____ 5-10 years

____ 1-2 years ____ 10 or more years

SECTION FOUR

In the space below (or on the back of the page), please write down any additional information about the job you supervise which you feel might be helpful to us in understanding that job. Thank you for your co-operation.

APPENDIX D

Changes to the Job Rating Form

Similar modifications to the JDS were made to the JRF. The initial definition of the course work and course requirements was included in the instructions for the JRF : "Please keep in mind that the course work includes attendence at lectures and lab groups, writing lab reports and essays, a statistics test, a mid-year and a final exam". The word 'job' was substituted with 'course' or 'course work', and 'supervisor' and 'boss' with 'tutor'.

The re-definitions of the job dimensions task identity and task significance were also implemented in the modified JRF format. In Section three, the question regarding job title was deleted, as all the tutors had the same position.

The additional variables role clarity, challenge and physical working conditions were included in the JRF as follows :

(a) *Role clarity*

(i) "To what extent are the demands/requirements of the course made apparent to the student?".

1 To a very low extent. The course requirements are out-lined in hand-outs with no further prompts.

4 Moderately.

7 To a large extent. The requirements of the course are frequently mentioned as well as being documented in hand-outs. (Section one, question seven).

(ii) "On the course, most of the tasks are clearly defined". (Section two, question sixteen).

(b) *Challenge*

(i) "How much challenge is there in the course work?"

1 Very little challenge; a person does not get a chance to use any special skills and abilities and never has tasks that require all of his/her abilities to complete them successfully.

4 Moderate challenge.

7 A great deal of challenge; a person gets a chance to use his/her special abilities and skills and often has tasks which require all of his/her abilities to complete them successfully. (Section one, question eight).

(ii) "The course work is very challenging". (Section two, question seventeen).

(c) *Physical working conditions*

"The physical working conditions tend to make it very difficult for a person to do the course work". (Section two, question fifteen).

APPENDIX E

P O S I T I O N

A N A L Y S I S

Q U E S T I O N N A I R E

INTRODUCTION

The Position Analysis Questionnaire (PAQ) is a structured job analysis questionnaire that can be used for analyzing positions or jobs of many different types.

ORGANIZATION OF THE QUESTIONNAIRE

The questionnaire is divided into the six major divisions listed below. In addition to the division titles, a "question" is included which can be kept in mind when going through each division.

Divisions:

1. Information Input (where and how does the worker get the information that he/she uses in performing his job?) Pages 4-7.

2. Mental Processes (what reasoning, decision-making, planning and information processing activities are involved in performing the job?). Pages 7-11.

3. Work Output (What physical activities does the worker perform and what tools or devices does he/she use?) Pages 11-16.

4. Relationships with Other Persons (What relationships with other people are required in performing the job?) Pages 16-20.

5. Job Context (In what physical and social contexts is the work performed?) Pages 20-23.

6. Other Job Characteristics (What activities, conditions, or characteristics other than those described above are relevant to the job?) Pages 23-28.

The six divisions that are listed above are further divided into sections and subsections. Each section or subsection is made up of a group of related job elements (in the questionnaire these are referred to as "Items"). Each job element described some general work activity, work condition, or job characteristic. In most cases examples are given to illustrate the "central idea" of the job element. However, these examples are intended only to help illustrate the idea and represent only a few of the possible examples that could characterize the job element.

RATING SCALES FOR JOB ELEMENTS

For each job element, provision is made for using a "rating scale" as the element applies to any given position/job. Several different rating scales are used throughout the questionnaire and are located on those pages to which they pertain, or on preceding pages. In general, they look like this:

Code	Extent of Use (U)
N	Does not apply
1	Nominal/very infrequent
2	Occasional
3	Moderate
4	Considerable
5	Very substantial

OR

Code	Applicability (A)
N	Does not apply
1	Does apply

At the beginning of each job element you will find a capital letter indicating the "scale"to be used for that element. For example, the entry for the first job element (no. 1) looks like this: 1U___. The "U" refers to the "Extent of Use (U)" rating scale which is shown above. Rating scales are marked with the letters which follow:

Letter	Rating Scale
U	Extent of Use (shown above)
T	Amount of Time
I	Importance to the Job
P	Possibility of Occurrence
A	Applicability (shown above)
S	Special Code (when this code is used, it applies only to the job element of which it is a part). Note that some "Special (S)" rating scales do not have an N (Does not apply) answer because the statement applies in some degree to every job.

Caution: For each job element use only the rating scale identified by the capital letter in front of it.

INSTRUCTIONS FOR JOB ANALYSTS

The person who is to analyze any position/job (the job analyst) should first familiarize himself/herself with the PAQ (including its organisation and job elements) and the various rating scales that are used with the individual job elements. In the rating of any given job element the analyst should select the rating scale value which he/she considers to be most appropriate for the position/job, considering the concept reflected by the job element itself, and the type of rating scale that it provided for use with that job element. The examples given for many job elements in the PAQ are intended to be only illustrative of the concept of the job element, and not as being indicative of the complete range of possible content. The analyst should interpret the "content" of each job element as it relates to the position which he/she is analyzing. In the case of any position/job there will of course be many job elements that do not apply. In such instances simply mark N (Does not apply). Use the open-ended job elements (40, 60, 127 and 181) only when that which they describe clearly falls outside the realm of the other elements.

RECORDING OF IDENTIFICATION INFORMATION AND RATINGS

Enter Responses to PAQ Items

For each job element, use the rating scale that is indicated by the letter next to the element (U, I, T, P, A or S). After deciding what response to make for each job element, write your response in the blank beside each item.

Review of Record Form

Review your responses to see that all identification information is provided, and that there is a response for every job element. The job you are about to rate is that Stage One Psyc Course work. This work includes attendance of lectures and labs, lab reports, essays, a statistics test, a mid-year and a final exam.

I N F O R M A T I O N I N P U T

1. INFORMATION INPUT

1.1 Sources of Job Information

Rate each of the following items in terms of the extent to which it is used by the worker as a source of information in performing his job.

Code	Extent of Use(U)
N	Does not apply
1	Nominal/very infrequent
2	Occasional
3	Moderate
4	Considerable
5	Very substantial

1.1.1 Visual Sources of Job Information

____ 1 U__ Written materials (books, reports, articles, job instructions, signs, etc.)

____ 2 U__ Quantitative materials (materials which deal with quantities or amounts, such as graphs, accounts, specifications, tables of numbers, etc.)

____ 3 U__ Pictorial materials (pictures or picturelike materials used as sources of information, for example, drawings, blueprints, diagrams, maps, tracings, photographic films, x-ray films, TV pictures etc.)

____ 4 U__ Patterns/related devices (templates, stencils, patterns, etc.used as sources of information when observed during use; do not include here materials described in item 3 above)

____ 5 U__ Visual displays (dials, gauges, signal lights, radarscopes, speedometers, clocks etc.)

____ 6 U__ Measuring devices (rulers, calipers, tire pressure gauges, scales, thickness gauges, pipettes, thermometers, protractors, etc. used to obtain visual information about physical measurements; do not include here devices described in item 5 above)

____ 7 U__ Mechanical devices (tools, equipment, machinery, and other mechanical devices which are sources of information when observed during use or operation).

____ 8 U__ Materials in process (parts, materials, objects etc. which are sources of information when being modified, worked on, or otherwise processed, such as bread dough being mixed, workpiece being turned in a lathe, fabric being cut, shoe being resoled. etc.)

____ 9 U__ Materials not in process (parts, materials, objects etc. not in the process of being changed or modified, which are sources of information when being inspected, handled, packaged, distributed or selected etc. such as items or materials in inventory, storage or distribution channels, items being inspected etc.)

____ 10 U__ Features of nature (landscapes, fields, geological samples, vegetation, cloud formations, and other features of nature which are observed or inspected to provide information).

____ 11 U Man-made features of environment (structures, buildings, dams, highways, bridges, docks, railroads,and other man-made or altered aspects of the indoor or outdoor environment which are observed or inspected to provide job information; do not consider equipment, machines etc. that an individual uses in his work as covered by item 7)

____ 12 U Behaviour (observing the actions of people or animals, for example, in teaching, supervising, sports officiating, etc. where this behaviour is a source of job information)

____ 13 U Events or circumstances (those events the worker visually observes and in which he may participate, such as flow of traffic, movement of materials, airport control tower operations etc)

____ 14 U Art or decor (artistic or decorative objects or arrangements used as sources of job information, for example, paintings, sculpture, jewelry, window displays, interior decoration etc)

1.1.2. Non-visual Sources of Job Information

____ 15 U Verbal sources (verbal instructions, orders, requests, conversations, interviews, discussions, formal meetings, etc. consider only verbal communication which is relevant to job performance).

____ 16 U Non-verbal sounds (for example, noises, engine sounds, sonar, whistles, musical instruments, signals, horns, etc.)

____ 17 U Touch (pressure, pain, temperature, moisture etc. for example, feeling texture of surface, etc.)

____ 18 U Odour(odours which the worker needs to smell in order to perform his/her job do not include odours simply because they happen to exist in the work environment).

____ 19 U Taste (bitter, sour, sweet, or salty qualities which are sources of job information, for example, wine taster, candy taster, etc)

1.2 Sensory and Peceptual Processes

____ 20 S Near-visual differentiation (using the code below, rate the amount of detail the worker must see to adequately obtain job information from objects, events, features, etc. within arm's reach).

Code	Degree of Detail
N	Does not apply (worker is blind or works in total darkness).
1	Very little detail (for example, that required in moving boxes, dumping trash, opening desk drawers, etc.)
2	Limited detail (for example, that required in bagging groceries, taking tickets, grinding hamburger, etc.)
3	Moderate detail (for example, that required in hammering nails, reading typed letters, reading dials & gauges, etc.)
4	Considerable detail (for example, reading small legal print, setting ignition points etc.)
5	Extreme detail (for example, that required in diamond cutting, repairing watches, assembling small electrical transistors, etc.)

INFORMATION INPUT

Note of rating "Importance to This Job":

Each of the items in the questionnaire which uses the "Importance to This Job (I)" scale is to be rated in terms of how important the activity described in the items is to the completion of the job. Consider such factors as amount of time spent, the possible influence on overall job performance if the worker does not properly perform this activity etc.)

Code	Importance to This Job (I)
N	Does not apply
1	Very minor
2	Low
3	Average
4	High
5	Extreme

____ 21 I___ Far visual differentiation (seeing differences in the details of objects, events, or features beyond arm's reach, for example, operating a vehicle, landscaping, sports officiating, etc.)

____ 22 I___ Depth perception (judging the distance from the observer to objects, or the distances between objects as they are positioned in space, as in operating a crane, operating a dentist's drill, handling and positioning objects etc.)

____ 23 I___ Colour perception (differentiating or identifying objects, materials, or details thereof on the basis of colour)

____ 24 I___ Sound pattern recognition (recognizing different patterns, or sequences of sounds, for example, those involved in Morse code, heartbeats, engines not functioning correctly, etc.)

____ 25 I___ Sound differentiating (recognizing differences or changes in sounds in terms of their loudness, pitch, and/or tone quality, for example, piano tuner, sound-system repairman, etc.)

____ 26 I___ Body movement sensing (sensing or recognizing changes in the direction or speed at which the body is moving without being able to sense them by sight or hearing, for example, as in flying aircraft, working in a submarine, etc.)

____ 27 I___ Body balance (sensing the position and balance of the body when body balance is critical to job performance, as when walking on beams, climbing high poles, working on steep roofs, walking on slippery floors, etc.)

1.3 Estimation Activities

INFORMATION INPUT AND MENTAL PROCESSES

In this section are various operations involving estimation or judging activities. In each case, consider activities in which the worker may use any or all of the senses, for example, sight, hearing, touch, etc.

____ 28 I__ Estimating speed of moving parts (estimating the speed of the moving parts associated with stationary objects, for example, the revolutions per minute of a motor, the speed at which a lathe turns, etc.)

____ 29 I__ Estimating speed of moving objects (estimating the speed of moving objects or materials relative to a fixed point or to other moving objects, for example, the speed of vehicles, materials on a conveyor belt, flow of liquids in transparent pipes etc.)

____ 30 I__ Estimating speed of processes (estimating the speed of ongoing processes or a series of events while they are taking place, for example, chemical reactions, assembly operations, timing of food preparation in a cafeteria, etc.)

____ 31 I__ Judging condition/quality (estimating the condition, quality, and/or value of objects, for example, antique dealer, appraiser, jeweler, used-car dealer, coin dealer, etc.)

____ 32 I__ Inspecting (inspecting products, objects, materials, etc. either one's own workmanship or that of others, in terms of established standards, for example, identifying defects, classifying by grade, etc; do not include here activities described in item 31 above).

____ 33 I__ Estimating quantity (estimating the quantity of objects without direct measurement, including weight, number, volume, etc., for example, estimating the board feet of lumber in a log, the weight of a beam, the number of bacteria in an area by looking through a microscope etc.)

____ 34 I__ Estimating size (estimating the dimensions of objects without direct measurement, including length, thickness, etc., for example, estimating the height of a tree, judging sizes of boxes or furniture in loading a truck, etc.)

____ 35 I__ Estimating time (estimating the time required for past or future events or work activities, for example, judging the amount of time to make a delivery, estimating the time required to service a worn machine part or piece of equipment; judging the length of time required to change a production line procedure, etc.)

2. Mental Processes

2.1 Decision Making, Reasoning and Planning/Scheduling

____ 36 S__ Decision making (indicate, using the code below, the level of decision making typically involved in the job, considering: the number and complexity of the factors that are taken into account; the variety of alternatives available; the consequences and importance of the decisions; the background experience, education, and training required; the precedents available for guidance; and other relevant consideration.

Code Level of Decision

1 Very limited ("decisions" such as those in selecting parts in routine assembly, shelving items in a warehouse, pasting labels on cartons, tending automatic machines, etc.)
2 Limited ("decisions" such as those in operating a wood planer, dispatching a taxi, lubricating an automobile, etc.)
3 Intermediate ("decisions" such as those in setting up machine tools for operation, diagnosing mechancial disorders of aircraft, ordering office supplies several months in advance, etc.)
4 Substantial ("decisions" such as those in determining production quotas, making personnel decisions such as promoting and hiring etc.)
5 Very substantial ("decisions" such as those in approving corporation annual budget, recommending major surgery, selecting the location for a new plant, etc.)

____ 37 S Reasoning in problem solving (indicate, using the code below, the level of reasoning that is required of the worker in applying knowledge, experience, and judgment to problems)

Code Level of Reasoning in Problem Solving

1 Very limited (use of common sense to carry out simple, or relatively uninvolved instructions, for example, janitor, deliveryman, hod carrier, etc.)
2 Limited (use of some training and/or experience to select from a limited number of solutions the most appropriate action or procedure in performing the job, for example, sales clerk, postman, electrician apprentice, keypunch operator etc.)
3 Intermediate (use of relevant principles to solve practical problems and to deal with a variety of concrete variables in situations where only limited standardization exists, for example, draftsman, carpenter, farmer etc.)
4 Substantial (use of logic or scientific thinking to define problems, collect information, establish facts and draw valid conclusions, for example, mechanical engineer, personnel director, manager of a "chain" store, etc.)
5 Very substantial (use of principles of logical or scientific thinking to solve a wide range of intellectual and practical problems, for example, research chemist, nuclear engineer, corporate president, or manager of a large branch or plant, etc.)

____ 38 S Amount of planning/scheduling (indicate, using the code below, the amount of planning/scheduling the worker is required to do which affects his/her own activities and/or the activities of others.

Code Amount of Planning

N Does not apply (has no opportunity even to plan his/her own activities; the specific activities of the worker are virtually predetermined for him/her)
1 Very limited (has limited opportunity to plan or schedule his own activities, for example, ticket seller at a theatre, "typical" assembly line worker, etc.)
2 Limited (some planning is required but not a great deal, for example, the planning that would be done by a milkman, janitor, etc.)
3 Moderate (a moderate amount of planning of his/her own or other activities required, for example, a carpenter who must plan the best way to build a structure, a taxi dispatcher, etc.)

(Item 38 continued on next page)

4 Considerable (a fairly large amount of planning/schedule is required, for example, a foreman who must plan the activities of his subordinates, a teacher who must prepare lectures or lesson plans, a material coordinator who must plan/schedule the arrival and distribution of materials, etc.)

5 Extensive (substantial amount of planning/scheduling is required, for example, a department store manager, an executive who must plan the activities of different work groups, an architect, a scientist who must make comprehensive and detailed plans to perform experiments etc.)

2.2 Information Processing Activities

In this section are various human operations involving the "processing" of information or data. Rate each of the following items in terms of how important the activity is to the completion of the job.

Code	Importance to this Job(I)
N	Does not apply
1	Very minor
2	Low
3	Average
4	High
5	Extreme

____ 39 I__ Combining information (combining, synthesizing, or integrating information or data from two or more sources to establish new facts, hypotheses, theories, or a more complete body of related information, for example, an economist using information from various sources to preduct future economic conditions, a pilot flying aircraft, a judge trying a case, etc.)

____ 40 I__ Analysing information or data (for the purpose of identifying underlying principles or facts by breaking down information into component parts, for example, interpreting financial reports, diagnosing mechanical disorders or medical symptoms etc)

____ 41 I__ Compiling (gathering, grouping, classifying, or in some other way arranging information or data in some meaningful order or form, for example, preparing reports of various kinds, filing correspondence on the basis of content, selecting particular data to be gathered , etc.)

____ 42 I__ Coding/decoding (coding information or converting coded information back to its original form, for example, "reading" Morse code, translating foreign languages, or using other coding systems such as shorthand, mathematical symbols, computer languages, drafting symbols, replacement part numbers, etc.)

____ 43 I__ Transcribing (copying or posting data of information for later use, for example, copying meter readings in a record book, entering transactions in a ledger, etc.)

____ 44 I__ Other information processing activities (specify)_____

MENTAL PROCESSES

2.3 Use of Learned Information

___ 45 I Short-term memory (learning and retaining job-related information and recalling that information after a brief period of time, for example, waitress, short-order cook, telephone operator, etc.)

___ 46 S Education (indicate, using the code below, the level of education generally or typically needed to perform this job; include education in elementary school, high school, college etc.; do not include technical,or vocational school training - see item 48).

Code	Education (given level or equivalent)
N	Does not apply (little or no formal education required)
1	Less than University Entrance.
2	University Entrance.
3	Tertiary education (but not a 3/4 year University degree).
4	Degree (degree requiring 3/4 years or more to complete, for example, B.A., B.Sc.,etc.)
5	Advanced degree (M.Sc.,Ph.D., M.D., LLD., etc.)

___ 47 S Job-related experience (indicate, using the code below, the amount of all previous job-related experience in other related or lower level jobs generally needed as background to learn this job; do not include formal education as described in item 46).

Code	Job-related Experience
N	Does not apply (no experience required)
1	Less than 1 month
2	Over 1 month up to and including 12 months
3	Over 1 year up to and including 3 years
4	Over 3 years up to and including 5 years
5	Over 5 years

___ 48 S Training (indicate, using the code below, the total amount of training generally needed for persons who have had no prior job training to learn to perform adequately on this job; consider all types of required job-related training except for education described in item 46; include training at barber schools, technical and vocational schools, business schools, etc. as well as apprentice, on-the-job, off-the-job and orientation training, etc.)

Code	Training
N	Does not apply or very limited (no more than one day's training required)
1	Over 1 day up to and including 30 days
2	Over 30 days up to and including 6 months
3	Over 6 months up to and including 1 year
4	Over 1 year up to and including 3 years
5	Over 3 years

____ 49 S Using mathematics (indicate, using the code below, the highest level of mathematics required by the job)

Code	Level of Mathematics
N	Does not apply
1	Simple basic (counting, addition and subtraction of 2 digit numbers or less)
2	Basic (addition and subtraction of numbers of 3 digits or more, multiplication, division etc.)
3	Intermediate (calculations and concepts involving fractions, decimals, percentages, etc.)
4	Advanced (algebraic, geometric, trigonometric, and statistical concepts, techniques, and procedures, usually applied in standard practical situations)
5	Very advanced (advanced mathematical and statistical theory, concepts, and techniques, for example, calculus, topology, vector analysis, factor analysis, probability theory, etc.)

3. WORK OUTPUT

3.1 Use of Devices and Equipment

3.1.1 Hand-held Tools or Instruments

Consider in this category those devices which are used to move or modify work-pieces, materials, products, or objects. Do not consider measuring devices here.

Code	Importance to this Job(I)
N	Does not apply
1	Very minor
2	Low
3	Average
4	High
5	Extreme

Manually powered.

____ 50 I Precision tools/instruments (that is, tools or instruments powered by the user to perform very accurate or precise operations, for example, the use of engraver's tools, watchmaker's tools, surgical instruments, etc.)

____ 51 I Nonprecision tools/instruments (tools or instruments powered by the user to perform operations not requiring great accuracy or precision, for example, hammers, wrenches, trowels, knives, scissors, chisels, putty knives, strainers, hand grease guns etc.; do not include long-handle tools here)

____ 52 I Long-handle tools (hoes, rakes, shovels, picks, axes, brooms, mops, etc.)

____ 53 I Handling devices/tools (tongs, ladles, dippers, forceps, etc., used for moving or handling objects and materials; do not include here protective gear such as asbestos gloves etc)

Powered (manually controlled or directed devices using an energy source such as electricity, compressed air, fuel, hydraulic fluid, etc., in which the component part which accomplishes the modification is hand-held, such as dentist drills, welding equipment, etc. as well as devices small enough to be entirely hand-held)

____ 54 I Precision tools/instruments (hand-held powered tools or instruments used to perform operations requiring great accuracy or precision, such as dentist drills, soldering irons, welding equipment, saws, etc., used for especially accurate or fine work)

WORK OUTPUT

____ 55 I__ Non-precision tools/instruments (hand-held, energy-powered tools or instruments used to perform operations not requiring great accuracy or precision, for example, ordinary power saws, drills, sanders, clippers, hedge trimmers, etc., and related devices such as electric soldering irons, spray guns or nozzles, welding equipment etc.)

3.1.2 Other Hand-held Devices

____ 56 I__ Drawing and related devices (instruments or devices used in lettering,sketching, illustrating, drafting etc., for example, pens, pencils, drawing instruments, artist's brushes, drafting equipment, etc.; do not include measuring instruments here, see item 58)

____ 57 I__ Applicators (bruches, rags, paint rollers, etc., which are hand-held and used in applying solutions, materials etc., do not consider devices covered by items 50-55 above)

____ 58 I__ Measuring devices (rules, measuring tapes, micrometers, calipers, protractors, squares, thickness gauges, levels, volume measuring devices, tyre gauges, etc.)

____ 59 I__ Technical and related devices (cameras, stopwatches, slide rules etc.)

____ 60 I__ Other hand-held tools and devices (specify)_____

3.1.3 Stationary Devices

____ 61 I__ Machines/equipment (operating, controlling, adjusting or monitoring machines/equipment used to process, fabricate, or otherwise modify parts, objects, materials, etc; use this category in addition to indicating the controls used in the subsection which follows)

3.1.4 Control Devices (on any equipment operated or used)

Code	Importance to this job(I)
N	Does not apply
1	Very minor
2	Low
3	Average
4	High
5	Extreme

____ 62 I__ Activation controls (hand or foot operated devices used to start, stop or otherwise activate energy-using systems or mechanisms, for example, light switches, electric motor switches, ignition switches, etc)

____ 63 I__ Fixed setting controls (hand-or-foot-operated devices with distinct positions, detents, or definite settings, for example, TV selector switch, gearshift, etc.)

____ 64 I__ Variable setting controls (hand-or-foot-operated devices that can be set at the beginning of operation, or infrequently, at any position along a scale, for example, TV volume control, room thermostat, rheostat, etc)

____ 65 I__ Keyboard devices (typewriters, adding machines, calculators, pianos, keypunch machines, etc.)

Frequent-adjustment controls (used in making frequent adjustments of mechanisms)

____ 66 I__ Hand-operated controls (controls, operated by hand or arm for making frequent, but not continuous, adjustments, for example, hand controls on a crane or bulldozer, helm of ship, etc.)

____ 67 I__ Foot-operated controls (controls operated by foot or leg for making frequent but not continuous adjustments, for example, automobile brakes, etc.)

Continuous controls (used continuously in operation or use)

____ 68 I__ Hand-operated controls (controls operated by hand and used continuously for adjusting to changing, or possible changing, situations, for example, use of steering wheel, controls on a "tracking" device, etc.)

____ 69 I__ Foot-operated controls (controls operated by foot and used continuously for adjusting to changing, or possibly changing, situations, for example, accelerator, etc.)

3.1.5 Transportation and Mobile Equipment

____ 70 I__ Man-powered vehicles (bicycles, rowboats, canoes, etc.)

____ 71 I__ Powered highway/rail vehicles (vehicles intended primarily for highway or railroad transportation, for example, automobiles, trucks, buses, trains, etc.)

____ 72 I__ Powered mobile equipment (movable vehicles not primarily intended for highway use, for example, warehouse trucks, fork lifts, self-propelled lawn mowers, road graders, tractors, combines, etc.)

____ 73 I__ Powered water vehicles (ships, submarines, motorboats,etc.)

____ 74 I__ Air/space vehicles (planes, helicopters, balloons, gliders, rocket ships etc.)

____ 75 I__ Man-moved mobile equipment (hand-pushed lawn mowers with or without powered blades, hand trucks, wheelbarrows, floor polishers and buffers etc.)

____ 76 I__ Operating equipment (cranes, hoists, elevators, etc.)

____ 77 I__ Remote-controlled equipment (conveyor systems, etc.)

3.2 Manual Activities

This section describes manual activities in which tools may or may not be used.

____ 78 I__ Setting up/adjusting (adjusting, calibrating, aligning and/or setting up of machines or equipment, for example, setting up a lathe or drill press, adjusting an engine carburetor, adjusting, calibrating, and aligning electric circuitry, etc.)

____ 79 I__ Manually modifying (using hands directly to form or otherwise modify materials or products, for example, kneading dough by hand, folding letters, massaging,etc.)

____ 80 I__ Material controlling (manually controlling or guiding materials being processed, for example, in operating sewing machine, jig saws, etc.)

WORK OUTPUT

___ 81 I__ Assembling/disassembling (either manually or with the use of hand tools putting parts or components together to form more complete items, or taking apart or disassembling items into their component parts)

___ 82 I__ Arranging/positioning (manually placing objects, materials, persons animals etc., in a specific position or arrangement, for example, arranging library books, window displays, stocking shelves, positioning patients for certain medical and dental procedures, etc.; do not include here arranging/positioning which is a part of the operations listed in items 78-81)

___ 83 I__ Feeding/off-bearing (manually inserting, throwing, dumping, or placing materials into or removing them from machines or processing equipment; this category is not to be used in describing operations in which the worker manually guides or controls the materials or parts during processing, as in item 80)

___ 84 I__ Physical handling (physically handling objects, materials, animals, human beings, etc. either manually or with nominal use of aiding devices, for example, in certain warehousing activities, loading/ unloading conveyor belts or trucks, packaging, farming activities, hospital procedures, etc; typically there is little requirement for careful positioning or arrangement of objects; include here relatively uninvolved handling operations not provided for in items 78-83).

3.3 Activities of the Entire Body

Code	Importance to this Job(I)
N	Does not apply
1	Very minor
2	Low
3	Average
4	High
5	Extreme

___ 85 I__ Highly skilled body coordination (acrivities involving extensive, and often highly learned coordination activities of the whole body, for example, athletics, dancing etc.)

___ 86 I__ Balancing (maintaining body balance or equilibrium to prevent falling when standing, walking, running, crouching, etc., on narrow slippery, steeply inclined, or erratically moving surfaces, for example, walking on narrow elevated beam, working on steep roof, etc.)

3.4 Level of Physical Exertion

___ 87 S__ Level of physical exertion (indicate, using the code below, the general level of body activity, considering the frequency and effort required to perform job tasks involving pushing, pulling carrying, lifting etc., during an average work day)

Code Level of Physical Exertion

1 Very light (occasionally walking or standing and/or occasionally moving light objects, materials, etc. such as secretary, draftsman, watchmaker, telephone operator, etc.)

WORK OUTPUT

Code	Level of Physical Exertion
2	Light (frequently walking or standing and/or frequently exerting force equivalent to lifting up to approximately 10 pounds and/or occasionally exerting force equivalent to lifting about 20 pounds, for example, sales clerk, bank teller, etc.)
3	Moderate (frequently exerting forces equivalent to lifting up to approximately 25 pounds and/or occasionally exerting forces equivalent to lifting up to approximately 50 pounds, for example, auto mechanic, coin vending machine serviceman, bus driver, etc.)
4	Heavy (frequently exerting forces equivalent to lifting up to approximately 50 pounds, and/or occasionally exerting forces equivalent to lifting up to approximately 100 pounds, for example, general labourer, millwright, bulldozer operator, baggage porter etc.)
5	Very heavy (frequently exerting forces equivalent to lifting over 50 pounds and/or occasionally exerting forces over that required to lift 100 pounds, for example, hod carrier, quarry miner, etc.)

3.5 Body Positions/Postures

Indicate by code the approximate proportion of working time the worker is engaged in the following activities (88-92)

Code	Amount of Time(T)
N	Does not apply (or is very incidental)
1	Under 1/10 of the time
2	Between 1/10 and 1/3 of the time
3	Between 1/3 and 2/3 of the time
4	Over 2/3 of the time
5	Almost continually

____ 88 T__ Sitting

____ 89 T__ Standing (do not include walking)

____ 90 T__ Walking/running

____ 91 T__ Climbing (for example, house painter, telephone lineman, etc.)

____ 92 T__ Kneeling/stooping (kneeling, stooping, crawling, crouching, and other related body positions which may be uncomfortable or awkward)

3.6 Manipulation/Coordination Activities

Rate the following items in terms of how important the activity is to completion of the job.

Code	Importance to this Job(I)
N	Does not apply
1	Very minor
2	Low
3	Average
4	High
5	Extreme

____ 93 I__ Finger manipulation (making careful finger movements in various types of activities, for example, fine assembly, use of precision tools, repairing watches, use of writing and drawing instruments, operating keyboard devices, etc., usually the hand and arm are not involved to any great extent)

WORK OUTPUT AND RELATIONSHIPS WITH OTHER PERSONS

____ 94 I__ Hand-arm manipulation (the manual control or manipulation of objects through hand and/or arm movements, which may or may not require continuous visual control, for example, repairing automobiles, packaging products, etc.)

____ 95 I__ Hand-arm steadiness (maintaining a uniform, controlled hand-arm posture or movement, for example, using a welding torch, performing surgery etc.)

____ 96 I__ Eye-hand/foot coordination (the coordination of hand and/or foot movements where the movement must be coordinated with what is seen, for example, driving a vehicle, operating a sewing machine, etc.)

____ 97 I__ Limb movement without visual control (movement of body limbs from one position to another without the use of vision, for example, reaching for controls without looking, playing a musical instrument, touch typing,etc.)

____ 98 I__ Hand-ear coordination (the coordination of hand movements with sounds or instructions that are heard, for example, tuning radio receivers, tuning musical instruments by ear, piloting aircraft by control tower instructions, etc.)

4. RELATIONSHIPS WITH OTHER PERSONS

This section deals with different aspects of interaction between people involved in various kinds of work.

Code	Importance to this Job(I)
N	Does not apply
1	Very minor
2	Low
3	Average
4	High
5	Extreme

4.1 Communications

Rate the following in terms of how important the activity is to the completion of the job. Some jobs may involve several or all of the items in this section.

4.1.1 Oral (communicating by speaking)

____ 99 I__ Advising (dealing with individuals in order to counsel and/or guide them with regard to problems that may be resolved by legal, financial, scientific, technical, clinical, spiritual, and/or other professional principles)

____ 100 I__ Negotiating (dealing with others in order to reach an agreement or solution, for example, labour bargaining, diplomatic relations etc.)

____ 101 I__ Persuading (dealing with others in order to influence them toward some action or point of view, for example, selling, political campaigning, etc.)

____ 102 I__ Instructing (the teaching of knowledge or skills, in either an informal or a formal manner, to others, for example, a public school teacher, a journeyman teaching an apprentice, etc.)

____ 103 I__ Interviewing (conducting interviews directed toward some specific objective, for example, interviewing job applicants, census taking, etc.)

____ 104 I__ Routine information exchange (the giving and/or receiving of information of a routine or simple nature, for example, ticket agent, taxicab dispatcher, receptionist, etc.)

RELATIONSHIPS WITH OTHER PERSONS

____ 105 I__ Non-routine information exchange (the giving and/or receiving of information of a non-routine or complex nature, for example, professional committee meetings, engineers discussing product design etc.)

____ 106 I__ Public speaking (making speeches or formal presentations before relatively large audiences, for example, political addresses, radio/TV broadcasting, delivering a sermon, etc.)

4.1.2 Written (communicating by written/printed material)

____ 107 I__ Writing (for example, writing or dictating letters, reports, etc., writing copy for ads, writing newspaper articles, etc.; do not include transcribing activities described in item 43)

4.1.3 Other Communications

____ 108 I__ Signaling (communicating by some type of signal, for example, hand signals, semaphore, whistles, horns, bells, lights,etc.)

____ 109 I__ Code communications (telegraph, cryptography, shorthand etc.)

4.2 Miscellaneous Interpersonal Relationships

Code	Importance to this Job (I)
N	Does not apply
1	Very minor
2	Low
3	Average
4	High
5	Extreme

____ 110 I__ Entertaining (performing to amuse or entertain others, for example, on stage, TV, nightclubs, etc.)

____ 111 I__ Serving/catering (attending to the needs of, or performing personal services for, others, for example, waiting on tables, hairdressing, etc.)

4.3 Amount of Job-required Personal Contact

____ 112 S__ Job-required personal contact (indicate, using the code below, the extent of job-required contact with others, individually or in groups, for example, contact with customers, patients, students, the public, superiors, subordinates, fellow employees, prospective employees, official visitors, etc; consider only personal contact which is definitely part of the job)

Code Extent of Required Personal Contact

1 Very infrequent (almost no contact with others is required)
2 Infrequent (limited contact with others is required)
3 Occasional (moderate contact with others is required)
4 Frequent (considerable contact with others is required)
5 Very frequent (almost continual contact with others is required)

4.4 Types of Job-required Personal Contact

This section lists types of individuals with whom the worker must have personal contact in order to perform his/her job. Indicate by code the importance of contact with each of the types of individuals listed below. Consider personal contact, not only with personnel within the organization

or company but also with personnel from other organizations, if contact with them is part of the job.

____ 113 I__ Executives/officials (corporation vice-presidents, directors, government administrators, plant superintendents, etc.)

____ 114 I__ Middle management/staff personnel

____ 115 I__ Supervisors (those personnel who have immediate responsibility for a work group, for example, foremen, office managers, etc)

____ 116 I__ Professional personnel (doctors, lawyers, scientists, engineers, professors, teachers, consultants, etc.)

____ 117 I__ Semiprofessional personnel (technicians, draftsmen, designers, photographers, surveyors, and other personnel who are engaged in activities requiring fairly extensive education or practical experience but which typically involve a more restricted area of operation than that of professional personnel)

____ 118 I__ Clerical personnel (personnel engaged in office work, such as clerks, bookkeepers, receptionists, etc.)

____ 119 I__ Manual and service workers (personnel in skilled, semiskilled, unskilled, agricultural, fishing, forestry, service, and related types of occupations, etc.)

____ 120 I__ Sales personnel

____ 121 I__ Buyers (purchasing agents, not public customers)

____ 122 I__ Public customers (as in stores, restaurants, etc.)

____ 123 I__ The public (not including customers or persons in other specified categories; include the "public" as contacted by, for example, park attendants, police officers, etc.)

____ 124 I__ Students/trainees/apprentices

____ 125 I__ Clients/patients/counselees

____ 126 I__ Special interest groups (stockholders, lobbyists, fraternal organizations, property owners, etc.)

____ 127 I__ Other individuals (include here types of persons not described in items 113-126 above, but, whenever possible, use one of the above categories)
Specify_____

4.5 Supervision and Coordination

4.5.1 Supervision/Direction Given

____ 128 S__ Supervision of nonsupervisory personnel (indicate using the code below, the number of persons directly supervised who are actually involved in the production of goods and services and do not supervise others; this item would apply, for example, to most "first line" supervisors, most foremen and section heads, service managers in garages, head butchers in meat departments, of grocery stores, head pharmacists, plumbers with assistants etc.)

Code overleaf

Code	Number of Nonsupervisory Personnel Supervised
N	Does not apply
1	1 or 2 workers
2	3 to 5 workers
3	6 to 8 workers
4	9 to 12 workers
5	13 or more workers

____ 129 S__ Direction of supervisory personnel (indicate, using the code below, the number of supervisory personnel - those who have responsibility for the supervision or direction of others - who report directly to the person holding this position; this item would apply to many middle and upper managers, but would also apply to managers of many small businesses or other activities who delegate supervisory authority to others, etc.)

Code	Number of Supervisory Personnel Directed
N	Does not apply (does not direct supervisors)
1	1 or 2 supervisory personnel
2	3 to 5 supervisory personnel
3	6 to 8 supervisory personnel
4	9 to 12 supervisory personnel
5	13 or more supervisory personnel

____ 130 S__ Total number of personnel for whom responsible (indicate, using the code below, the total number of personnel for whom the person holding this job is either directly or indirectly responsible, for example, the president of a corporation would be responsible for all corporation employees, the branch manager would be responsible for personnel in his/her branch, a foreman for personnel he/she supervises, a plumber for his/her assistant, etc; use this item in addition to 128 and/or 129)

Code	Total number of personnel for whom responsible
N	Does not apply (not responsible for other personnel)
1	10 or fewer workers
2	11 to 50 workers
3	51 to 250 workers
4	251 to 750 workers
5	751 or more workers

4.5.2 Other Organizational Activities

This subsection includes activities of a coordinating, staff or supervisory nature.

Code	Importance to this Job(I)
N	Does not apply
1	Very minor
2	Low
3	Average
4	High
5	Extreme

____ 131 I__ Supervises non employees (students, patients, campers, etc.)

____ 132 I__ Coordinates activities (coordinates, monitors, or organizes the activities of others to achieve certain objectives, but does not have the management authority, for example, social director, committee chairman, etc.)

RELATIONSHIPS WITH OTHER PERSONS AND JOB CONTEXT

____ 133 I__ Staff functions (advises, consults, or gives other types of assistance toline management personnel, for example, legal adviser, administrative assistant, etc.)

4.5.3 Supervision Received

____ 134 S__ Supervision received (indicate, using the code below, the level of supervision the worker typically receives)

Code Level of Supervision Received

1 Immediate supervision (receives close supervision relating to specific work activities, including assignments, methods, etc; usually receives frequent surveillance over job activities)

2 General supervision (receives general supervision relating to work activities)

3 General direction (receives only very general guidance relating to job activities, primarily guidance with respect to general objectives; has rather broad latitude for determining methods, work scheduling, how to achieve objectives, etc, for example, first-line supervisors, lower-management individuals, most staff personnel, people whose work is quite independent of others, etc)

4 Nominal direction (receives only nominal direction or guidance in job, as in the case of a manager of an organization or a major subdivision thereof, and is therefore subject only to very broad policy guidelines, for example, some research scientists who are given virtually free rein, many plant superintendents, etc.)

5 No supervision (this category is applicable to those personnel who function independently, for example, owner-managers of stores, independent physicians, independent consultants, etc.)

5. JOB CONTEXT

5.1 Physical Working Conditions

This section lists various working conditions. Rate the average amount of time the worker is exposed to each condition during a typical work period.

Code	Amount of Time(T)
N	Does not apply (or is very incidental)
1	Under 1/10 of the time
2	Between 1/10 and 1/3 of the time
3	Between 1/3 and 2/3 of the time
4	Over 2/3 of the time
5	Almost continually

5.1.1 Outdoor environment

____ 135 T__ Out-of-door environment (subject to changing weather conditions)

5.1.2 Indoor temperatures (do not consider indoor temperature conditions that are simply a function of the weather, for example, heat in summer; consider only those conditions which are associated with this job regardless of the natural climate in which is might be performed.

____ 136 T High temperature (conditions in which the worker might experience severe discomfort or heat stress, such as boiler rooms, around furnaces etc; typically this would occur in a dry atmosphere at about 90^0 F. and in a humid atmosphere at about 80^0 F. or 85^0F.)

____ 137 T Low temperatures (conditions in which the worker is exposed to low temperatures which are definitely uncomfortable even though clothing appropriate for the conditions may be worn, such as in refrigerated rooms etc.)

5.1.3 Other physical working conditions

____ 138 T Air contamination (dust, fumes, smoke, toxic conditions, disagreeable odours, etc; consider here air contamination or pollution which is an irritating or undesirable aspect of the job)

____ 139 T Vibration (vibration of whole body or body limbs; for example, driving a tractor or truck, operating an air hammer etc)

____ 140 T Improper illumination (inadequate lighting, excessive glare etc)

____ 141 T Dirty environment (an environment in which the worker and/or his clothing easily becomes dirty, greasy etc; for example, environments often associated with garages, foundries, coal mines, highway construction, furnace cleaning etc.)

____ 142 T Awkward or confining work space (conditions in which the body is cramped or uncomfortable)

____ 143 S Noise intensity (indicate, using the code below, the typical noise level to which the worker is exposed)

Code Noise Intensity

1 Very quiet (intensive care ward in hospital, greenhouse, photo lab, etc.)
2 Quiet (many private offices, libraries etc)
3 Moderate (business office where typewriters are used, light automobile traffic, department store, etc)
4 Loud (many factories, heavy traffic, machine shops, carpenter shops etc)
5 Very loud (close to jet engines, large earth-moving equipment, riveting etc.)

JOB CONTEXT

5.2 Physical Hazards

Code	Possibility of Occurrence(P)
N	No possibility
1	Very limited
2	Limited
3	Moderate
4	Fairly high
5	High

The four items which follow describe accidents or illnesses which may result from exposure to hazards. Rate the possibility of the occurrence of each of the types of accidents/illnesses to the typical worker on this job. In making the ratings consider the safety/accident record of employees on this job, and/or the possibility of accidents due to such factors as: travelling at high speeds, being in high places, working with machinery, sharp tools, hot or very cold materials, exposure to falling objects, dangerous chemicals, explosives, toxic fumes, radiation, etc.

____ 144 P First-aid cases (minor injuries or illnesses which typically result in a day or less of "lost" time and are usually remedied with first-aid procedures)

____ 145 P Temporary disability (temporary injuries or illnesses which prevent the worker from performing the job from one full day up to extended periods of time but which do not result in permanent disability or impairment)

____ 146 P Permanent partial impairment (injuries or illnesses resulting in the amputation or permanent loss of use of any body member or part thereof, or permanent impairment of certain body functions)

____ 147 P Permanent total disability/death (injuries or illnesses which totally disable the worker and permanently prevent his further gainful employment, for example, loss of life, sight, limbs, hands, or radiation sickness, etc.)

5.3 Personal and Social Aspects

This section includes various personal and social aspects of jobs. Indicate by using the code the importance of these aspects as part of the job.

Code	Importance to this Job (I)
N	Does not apply
1	Very minor
2	Low
3	Average
4	High
5	Extreme

____ 148 I Civic obligations (because of the job the worker assumes, or is expected to assume, certain civic obligations or responsibilities)

____ 149 I Frustrating situations (job situations in which attempts to deal with problems or to achieve job objectives are obstructed or hindered, and may thus contribute to frustration on the part of the worker.)

____ 150 I Strained personal contacts (dealing with individuals or groups in "unpleasant" or "strained" situations, for example, certain aspects of police work, certain types of negotiations, handling certain mental patients, etc.)

____ 151 I Personal sacrifice (being willing to make certain personal sacrifices while being of service to other people or the objectives of an organization, for example, policemen, ministry, social work, etc; do not consider physical hazards here)

____ 152 I Interpersonal conflict situations (job situations in which there are virtually inevitable differences in objectives, opinions, or viewpoints between the worker and other persons or groups of persons, and which may "set the stage" for conflict, for example, persons involved in labour negotiations, supervisors who must enforce an unpopular policy, etc.)

____ 153 S Non-job-required social contact (indicate, using the code below the opportunity to engage in informal, non-job-required conversation, social interaction, etc., with others while on the job, for example, barber, taxi driver, receptionist, journeyman and apprentice, etc; do not include here the personal contacts required by the job as described in item 112)

Code	Opportunity for non-job-required social contact
1	Very infrequent (almost no opportunity)
2	Infrequent (limited opportunity)
3	Occasional (moderate opportunity)
4	Frequent (considerable opportunity)
5	Very frequent (almost continual opportunity)

6. OTHER JOB CHARACTERISTICS

Code	Applicability(A)
N	Does not apply
1	Does apply

6.1 Apparel Worn

For each item mark N (Does Not Apply) if the item does not apply, a one(1) if the item applies. Note: one or more items in this section may be applicable.

____ 154 A Business suit or dress (expected to wear presentable clothing such as tie and jacket, street dress, etc; as customary in offices, stores, etc.)

____ 155 A Specific uniform/apparel (nurse, doorman, bus driver etc)

____ 156 A Work clothing ("blue collar" apparel worn in factories, construction work, etc.)

____ 157 A Protective clothing or gear (clothing or equipment worn as a regular part of the job to protect the worker, for example, safety helmets, goggles, noise suppressors, safety shoes, insulated gloves or clothing, protective masks, etc; this item does not apply if worn only occasionally or rarely)

____ 158 A Informal attire (sportswear, etc.)

____ 159 A Apparel style optional

6.2 Licensing

____ 160 A Licensing/certification required

OTHER JOB CHARACTERISTICS

Code	Applicability(A)
N	Does not apply
1	Does apply

6.3 Work Schedule

In each of the three groups of items (in boxes) below, mark a one(1) for the item in each boxed group that most nearly applies; mark N for all other items in the same boxed group.

6.3.1 Continuity of work (as relevant to total year)

____ 161 [A] Regular work

____ 162 [A] Irregular work (depending on weather, season, production changes, etc.)

6.3.2 Regularity of working hours

____ 163 [A] Regular hours (same basic work schedule every week)

____ 164 [A] Variable shift work (work shift varies from time to time)

____ 165 [A] Irregular hours (works variable or irregular hours, depending on requirements of employer, convenience of customers, etc. for example, insurance agents, etc)

6.3.3 Day-night schedule

____ 166 [A] Typical day hours

____ 167 [A] Typical night hours (including evening work)

____ 168 [A] Typical day and night hours (works some days and some nights, depending on work shifts, job demands, schedules, or other job factors, for example, some policemen, some truck drivers, some steelworkers, etc.)

6.4 Job Demands

This section lists various types of demands that the job situation may impose upon the worker, usually requiring that he adapt to these in order to perform his work satisfactorily. Rate the following items in terms of how important they are on the job.

Code	Importance to this Job(I)
N	Does not apply
1	Very minor
2	Low
3	Average
4	High
5	Extreme

____ 169 I Specified work pace (on continuous assembly line, etc.)

____ 170 I Repetitive activities (performance of the same physical or mental activities repeatedly, without interruption, for periods of time)

OTHER JOB CHARACTERISTICS

____ 171 I__ Cycled work activities (performance of a sequence or schedule of work activities which typically occurs on a weekly, daily, or hourly basis and which typically allows the worker some freedom of action so long as he meets a schedule, for example, a postman or milkman making rounds on his route, a security guard patrolling his beat, etc.; do not include here activities more nearly described as repetitive activities in item 170 above).

____ 172 I__ Following set procedures (need to follow specific set procedures or routines in order to obtain satisfactory outcomes, for example, following check-out list to inspect equipment or vehicles, following procedures for changing a tyre, performing specified laboratory tests, etc.)

____ 173 I__ Time pressure of situation (rush hours in a restaurant, urgent time deadlines, rush jobs, etc.)

____ 174 I__ Precision (need to be more than normally precise and accurate)

____ 175 I__ Attention to detail (need to give careful attention to various details of one's work, being sure that nothing is left undone.

____ 176 I__ Recognition (need to identify, recognise, or "perceive" certain objects, events, processes, behaviour, etc, or aspects, features or properties thereof; this item is primarily concerned with "recognition" of that which is "sensed" by vision, hearing, touch etc.)

____ 177 I__ Vigilance; infrequent events (need to continually search for very infrequently occurring but relevant events in the job situation, for example, forest lookout watching for forest fires, worker observing instrument panel to identify infrequent change from "normal", etc.)

____ 178 I__ Vigilance; continually changing events (need to be continually aware of variations in a continually or frequently changing situation, for example, driving in traffic, controlling aircraft traffic, continually watching frequently changing dials and gauges, etc.)

____ 179 I__ Working under distractions (telephone calls, interruptions, disturbances from others, etc.)

____ 180 I__ Updating job knowledge (need to keep job knowledge current, being informed of new developments related to the job)

OTHER JOB CHARACTERISTICS

____ 181 A__ Special talent (using the code below indicate if a job requires some particularly unique talent or skill that is not covered by other items; typically this item would apply to jobs in which the very unique skill or characteristic of the worker is clearly dominant, as in certain entertainment activities; the item may be used, however, in certain other kinds of situations, but only where there is some distinctly unique or special skill or talent involved).
Special talent: _____

Code	Applicability(A)
N	Does not apply
1	Does apply

Code	Amount of Time(T)
N	Does not apply (or is very incidental)
1	Under 1/10 of the time
2	Between 1/10 and 1/3 of the time
3	Between 1/3 and 2/3 of the time
4	Over 2/3 of the time
5	Almost continually

____ 182 T__ Travel (indicate by code the proportion of time the worker is required to travel because of the job)

6.5 Responsibility

This section includes types of responsibility which may be associated with the decisions and actions of the worker. Indicate by code the degree of each type of responsibility involved in the job.

____ 183 S__ Responsibility for the safety of others (indicate, using the code below, the degree to which the work requires diligence and effort to prevent injury to others; do not include hazards beyond the control of the individual concerned with the job)

Code Degree of Responsibility for the Safety of Others

- N Does not apply
- 1 Very limited (worker has minimum responsibility for the safety of others, for example, he may only use the small hand tools, nonhazardous machines, etc)
- 2 Limited (worker must exercise reasonable care in order to avoid injury to others, for example, operating lathes, punch presses, and other industrial machines, etc.)
- 3 Intermediate (worker must be especially careful in order to avoid injury to others, for example, operating overhead cranes, driving vehicles etc)
- 4 Substantial (worker must exercise constant and substantial care in order to prevent serious injury to others, for example, handling dangerous chemicals, using explosives etc)
- 5 Very substantial (the safety of others depends almost entirely on the correct action of the employee, for example, piloting an aircraft, performing major surgery, etc.)

OTHER JOB CHARACTERISTICS

____ 184 S Responsibility for material assets (indicate, using the code below, the degree to which the worker is directly responsible for waste, damage, defects, or other loss of value to material assets or property, such as materials, products, parts, equipment, cash, livestock, etc., that might be caused by inattention or inadequate job performance)

Code	Degree of Responsibility for Material Assets
1	Very limited (for example, a few dollars)
2	Limited (for example, up to about one hundred dollars)
3	Intermediate (for example, a few hundred dollars)
4	Substantial (for example, one or two thousand dollars)
5	Very substantial (for example, more than two thousand dollars)

____ 185 S General responsibility (indicate, using the code below, the degree of general or overall responsibility associated with whatever activities are involved in the job, including consideration of the possible effects of the person's work activities on the organization, on other people, on the work output etc., excluding consideration of responsibility for the safety of others or for material assets as described in item 183 and 184.)

Code	Degree of General Responsibility
1	Very limited
2	Limited
3	Intermediate
4	Substantial
5	Very substantial

6.6 Job Structure

____ 186 S Job structure (indicate, using the code below, the amount of "structure" of the job, that is, the degree to which the job activities are "predetermined" for the worker by the nature of the work, the procedures, or other job characteristics; the more highly structured jobs permit less deviation from predetermined patterns, and little if any need for innovation, decision making, or adaption to changing situations)

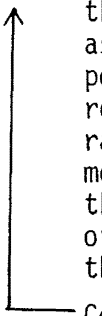
Code	Amount of Job Structure
1	Very high structure (virtually no deviation from a predetermined job "routine", for example, routine assembly work, etc)
2	Considerable structure (only moderate deviation from predetermined work "routine" is possible, for example, bookkeeper, stock handler, etc.)
3	Intermediate structure (considerable change from a "routine" is possible; work activities change considerably from day to day or even from hour to hour, but usually within some reasonable and expected bounds, for example, carpenter, automobile mechanic, machinist, etc.)

4 Limited structure (relatively little routine work; the job is characterized by considerable opportunity for improving methods, devices, etc., and the necessity for making decisions, for example, store manager, industrial engineer, etc.)

5 Very low structure (virtually no established "routine" of activities; the position involves a wide variety of problems which must be dealt with; the solutions to these problems allow for unlimited resourcefulness and initiative, for example, research chemist, corporation vice-president, college professors,etc)

6.7 Criticality of Position

____ 187 S__ Criticality of position (indicate, using the code below, the degree to which the performance of activities associated with this job are critical in terms of their possible effects on the organizational operations, assets, reputation, etc., or on the public or other people. In rating a job, consider particularly the possible detrimental effect of inadequate job performance; consider the duration of such consequences, whether immediate or long-term, their seriousness and the extent to which they have restricted or wide-spread effects).



Code	Degree of Criticality of Position
1	Very low
2	Low
3	Moderate
4	High
5	Very high

APPENDIX F

Changes to the Position Analysis Questionnaire

Few modifications were made to the PAQ. One major change made was to the recording of responses from the analysts. The original recording of responses uses the PAQ Record Form. Each of the responses to the 194 items is pencilled onto the record form which is on a separate page from the PAQ Questionnaire. The researcher replaced this method of recording with a space provided beside each item on the PAQ itself. The reason for this change was to : a) reduce errors in transferring the ratings from one form to the other; and b) make fewer cognitive demands on the analysts.

As in the JDS, the section concerning pay and other income (Section 6.8, questions 188 to 194) was eliminated, as the questions are inappropriate to the student context. The final modification was gender-based. The original format of the PAQ the worker is referred to as male. As noted above, the female to male ratio was 180 : 148 in the stage one Psychology sample. 'He' and 'his' were substituted with 'he or she', and 'his' or 'her' through-out the questionnaire.